

Rock Products

TRADEPRESS PUBLISHING CORPORATION
542 SOUTH DEARBORN STREET
CHICAGO

NATHAN C. ROCKWOOD, Editor CHAS. H. FULLER, Manager CHAS. A. BRESKIN, Assistant Editor

Vol. XXIII, No. 13

June 19, 1920

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Applicant for membership in Audit Bureau of Circulations
Second class entry at U. S. Post Office.

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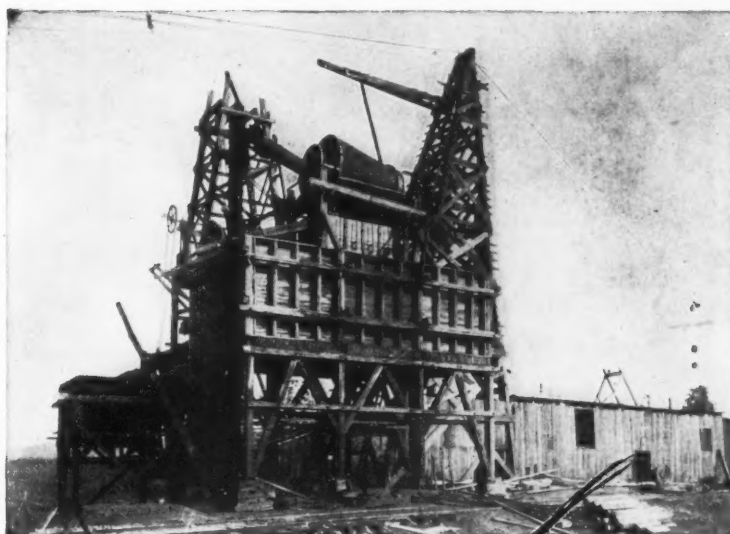
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The Webster Cyl-Cone Screen permits a particularly economical arrangement and construction for a plant to make three or more size separations.

It is the business of Webster engineers to know the best way to install sand and gravel plant equipment to meet your needs.

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Of this be assured:—We build practically every type of equipment and so have no favorites to play. Your information and a request for plans will bring impartial recommendations, without obligation.

(OC)

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New York

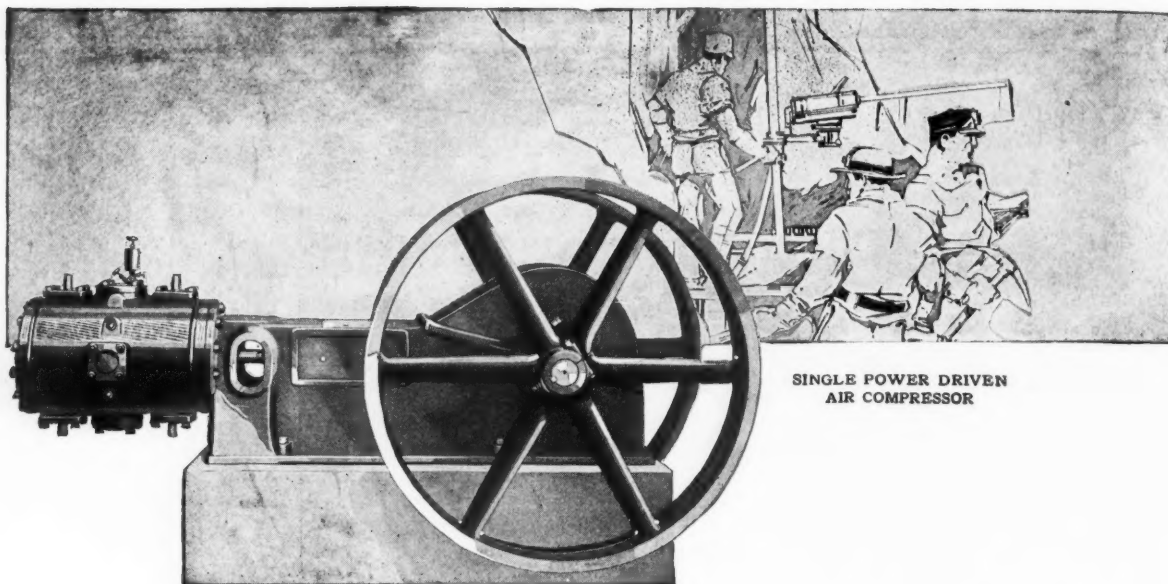
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What "FEATHER" Valve

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"FEATHER" Valve means first: COMPRESSION. It means compression that is sure, safe and always on tap. It means also, Worthington apparatus — the sort that is standard the world over, on land or sea.

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HERE lime is used for industrial purposes or chemical processes, the lime produced by Rotary Kilns is a vastly superior and far less expensive product than that from stationary kilns.

Not only is quality higher, but the operating cost of Rotary Kilns is lower than that of stationary types.

There are many reasons for this which are incorporated in the design and construction details of VULCAN Rotary Kilns.

Correspondence Invited.

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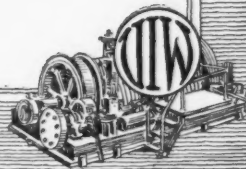
*Designers and Builders of
Rotary Kilns for 26 Years*

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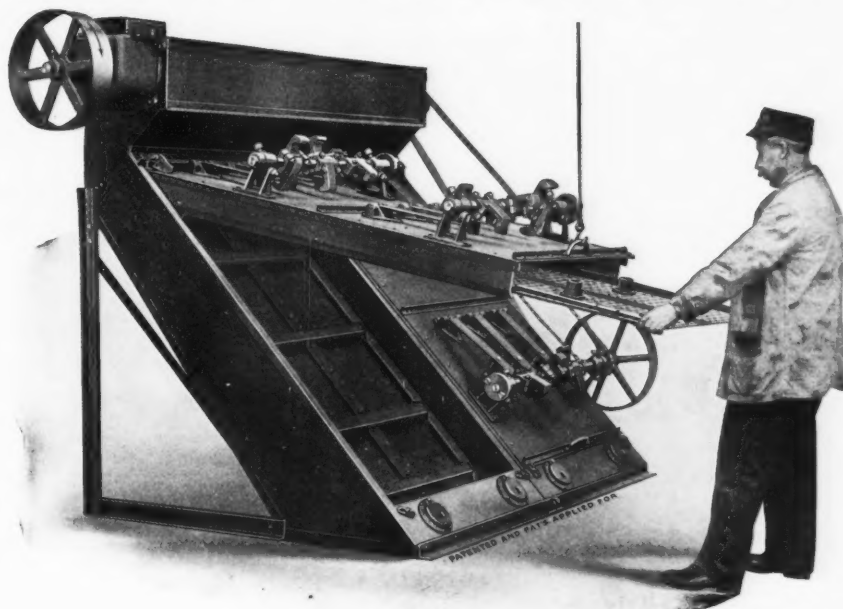


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STURTEVANT "OPEN-DOOR" MACHINERY

"Open Door" Sturtevant Super-Screen



The Super-Screen not only screens everything screenable with a range of 4 to 160 mesh, giving from one to four products from one machine, but is of Sectional, or Unit, "Open Door" construction with all parts interchangeable and of such small size that one man can handle them easily and quickly. Add sufficient number of Units to secure output wanted.

You see one man opens the door, removes the screen frames, both scalper and fine screens, and tightens the cloth—all through the open door. A one man proposition throughout—no time or labor wasted. Keep the screen in perfect condition for maximum output.

Open Door Super-Screens, like all other Sturtevant "Open Door" Machines, are built for service, to give maximum profit, to do your work cheaper than any other Screen, and they last.

Send for Catalog of Open Door Designs of Crushing, Grinding, Screening, Elevating, Conveying, Weighing and Mixing Machinery.

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HARRISON SQUARE



3200 tons per day!

That's the capacity of the above plant which we installed for the Flint Crushed Gravel Co. of Des Moines, Iowa.

It is the example not only of a big job, but of the versatility of Good Roads service, for we design, build and install complete sand and gravel excavating, elevating, conveying, crushing, screening and washing equipment of all kinds—large or small.

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Catalog No. 5 containing full particulars will be sent free on request.

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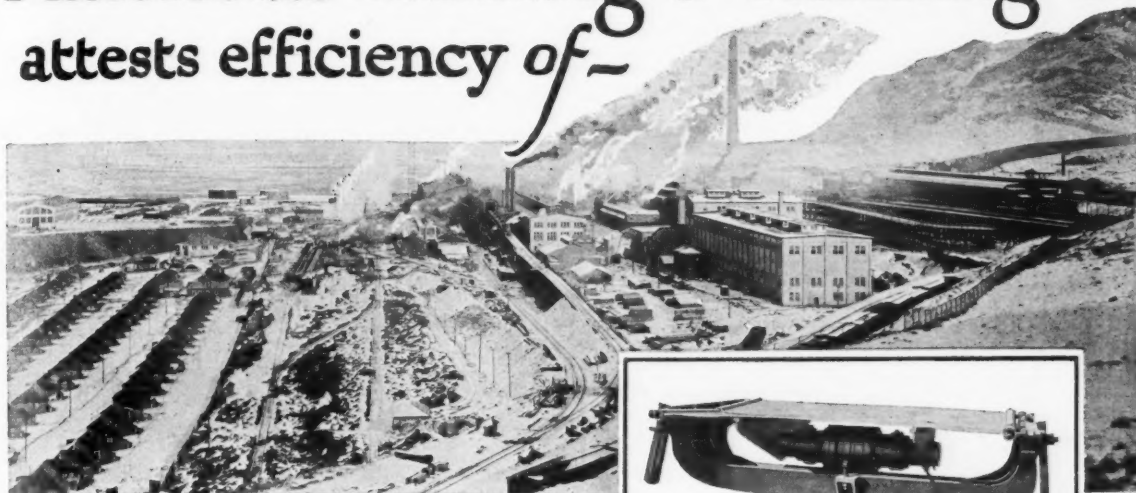
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American Smelting & Refining Co. attests efficiency of—



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The American Smelting & Refining Company has had the Mitchell Screen in operation at its big plant at Garfield, Utah, for seven months. Respecting the Mitchell, the Vice President of the company said:

"At my request, several of our Mechanical Engineers as well as members of the operating staff visited the Arthur Mill (Utah Copper Co.) and inspected this screen. In the opinion of all these gentlemen the Mitchell Screen is far superior to any other screen of which we have had previous knowledge."

And in the same letter: "The construction and operation of this screen is so much in advance of anything that we have heretofore seen that I do not see how anyone who investigates it thoroughly can fail to be convinced of its entire superiority over any other screen that he might purchase."

Although never operated to anything approaching capacity, the Mitchell Screen in the American Smelting & Refining Company's plant averages 30 tons of screened ore per hour through $\frac{3}{8}$ " mesh. And the power required is less than $\frac{3}{8}$ H. P. per screen. Continuous operation for months here, as elsewhere, has proved the correctness of the Mitchell design and its unequalled ability to stand long and arduous usage, without even removing the mechanism from the frame.

The Mitchell handles any granular or crystalline material, coarse or fine, wet or dry

The experience of such firms as the American Smelting & Refining Company will unquestionably prove of value to you in the solution of your screening problems. We shall be pleased to furnish you complete data on request.

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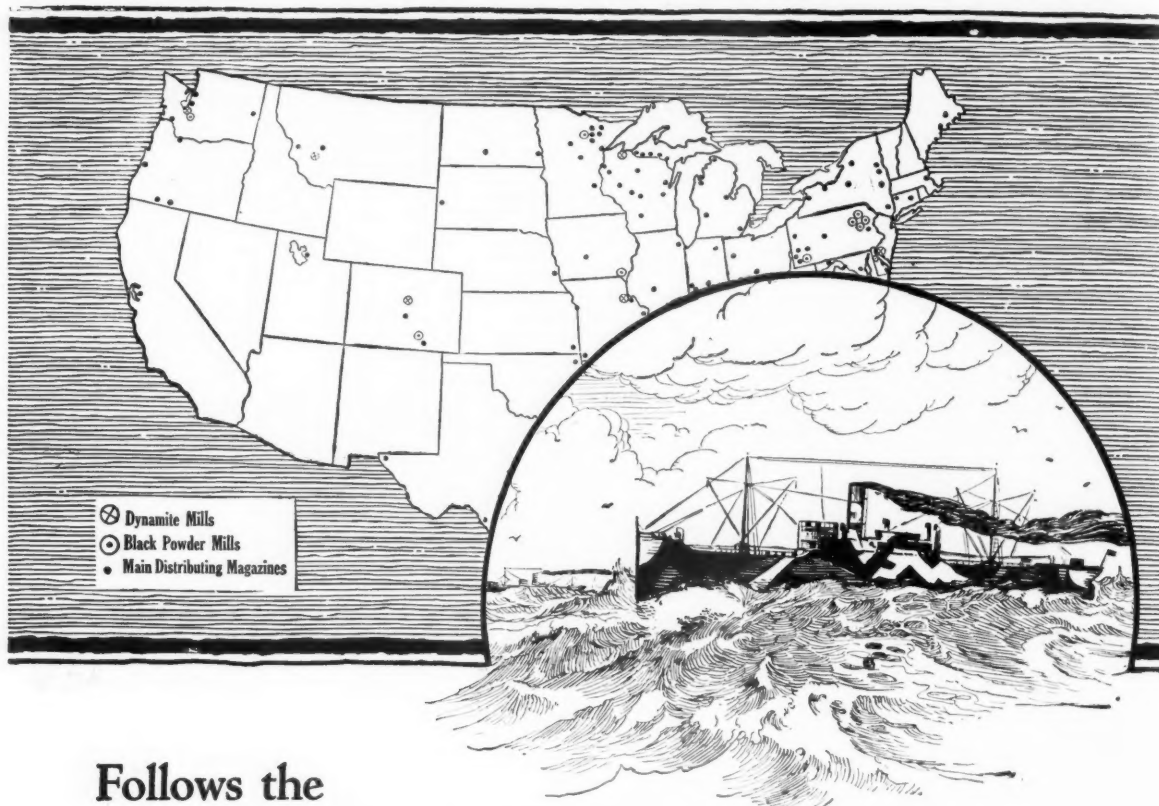
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SALT LAKE CITY, UTAH

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Du Pont Explosives Service

—Everywhere



Follows the

Demand —

*When the Powder
Fleet Sailed*



WHEN the great fleets of zebra-striped ships sailed eastward, Du Pont Explosives Service looked first to the needs of the industrial users in this country. Nowhere was a mine allowed to slow down, a quarry to stop or an excavation to go unfinished because of the lack of Du Pont Explosives. This was in keeping with our policy, fixed over one hundred years ago, to let nothing interfere with our Service to the Industries—but it took the greatest makers of explosives in the world to cope with the great emergency in the last five years.

Our unequalled experience in this field puts us in a position to advise on any phase of the use of explosives, their storage or transportation. This experience is available to everybody. Now—as always—for most satisfactory results, specify "Du Pont."

E. I. du Pont de Nemours & Company, Inc.

Sales Dept.: Explosives Division
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Measuring Telsmith Breakers

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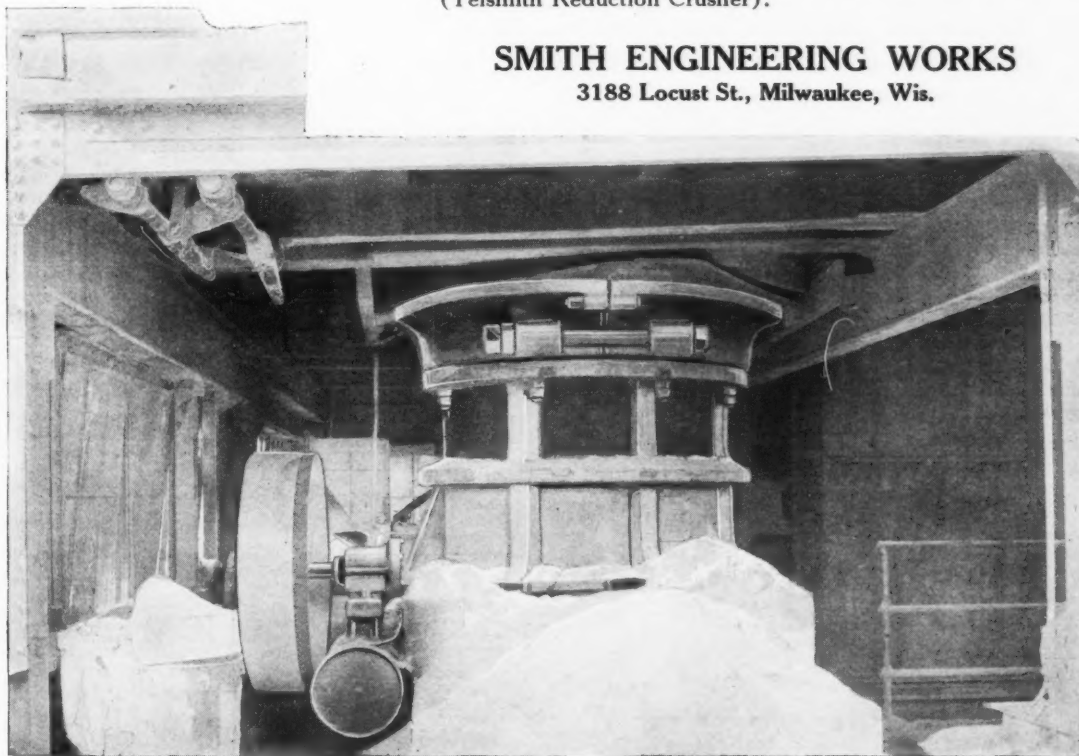
Breakers are usually bought according to **width** of receiving opening. The length of the receiving opening is disregarded. The bottom diameter and depth of the bowl, the concaves and head areas are all ignored. And how many engineers ever thought to measure the length of the crushing stroke at the top of the head? And yet all these elements are important in determining the capacity of a coarse crusher and the size of rock it will take.

For instance—here is a No. 7½ Telsmith Primary Breaker, with two 14 in. x 70 in. feed openings. The crushing pinch at the top of the head is 11/16 in. The top diameter of the concave circle is 57 in. The bottom diameter is 48 in. The crushing cone measures 29 in. (top diam.) by 41½ in. (bottom diam.) by 34 in. (height).

Contrast these measurements with a typical No. 7½ of lever-shaft design, having two 14 in. x 52 in. feed openings. The crushing pinch at the top of the head is only about 3/8 in., when brand new. The top diameter of the concave circle is 49 in. The bottom diameter is 31 in. The crushing cone measures 22 in. x 31 in. x 34½ in. These two machines are commonly ranked as crushers of equal receiving opening and capacity, merely because the receiving openings are of the same width. Need we emphasize further the fallacy of this practice? Glad to send your catalog No. 166 (Telsmith Primary Breaker) and Bulletin No. 2F11 (Telsmith Reduction Crusher).

SMITH ENGINEERING WORKS

3188 Locust St., Milwaukee, Wis.



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DUPLEX TRUCKS

BUILT FOR BUSINESS

Careless Truck Buying Makes Transportation Cost Too Much!

The Truck is a Piece of Business Machinery. It Should Represent the Most Economical Method for Doing its Particular Job. Buy Your Truck on That Basis—And it Will be a Good Investment

RISING costs and the shrinking value of the dollar to a large extent can be offset by *intelligent buying*.

A steadily increasing number of business men are getting the facts and then *buying* their trucks on the basis of the facts.

There are many good trucks on the market. But value in a truck, very much like character in a man, isn't always completely revealed by what the eye can see.

Back of every Duplex Truck are *Fundamental Principles*—of design and of construction—factors that result in the *remarkable degree of service value* in Duplex trucks for the man who buys.

There is Nothing Somebody Else Can Do to Save a Man From Paying the Price of His Own Limitation or His Own Carelessness

Look in the used car columns of your local paper. Note the number and makes of trucks offered for sale and *think about* all the reasons.

In one day in three cities 324 different used trucks were listed for sale—and not one Duplex among them.

Are these trucks for sale because they were not bought right?

There is something significant here when you stop to analyze it.

Why is this tendency to standardize on Duplex so noticeable of late years?

The answer is very likely that trucks are *more and more being bought on the business basis of service delivered and what the service costs over a period of years*.

This is a Time for Intelligent Buying

A truck is just as much a piece of business equipment as any other piece of machinery. Its value is in *what it does and how cheaply it does it*.

Transportation is a necessary part of every business.

A truck gives a business man transportation facilities—at a high or a low price. *It depends on the fitness of the truck for its job.*

Now take a man who buys a truck for his business without getting all the facts first. Later he discovers that his truck is not as economical as it should be. He sells it at a sacrifice and gets another—and so on. Finally he buys the truck he should have selected the first time.

What is the result?

He pays too much for his transportation. His costs for trucking are not right.

The Duplex Users of Today Are Probably the Most Intelligent Buyers and Users of Trucks in America

Think of this—ninety per cent of the Duplex dealers have been distributing Duplex Trucks ever since this company was first organized.

What does this signify? It shows for one thing that their customers have found the Duplex Truck to be a successful truck for them.

The great significance of all this is that *Duplex users stay Duplex users*. Many of them had tried out five or six different makes of trucks before they got their first Duplex.

The whole history of this business shows that when a man buys his first Duplex it is only a little while until *he standardizes on Duplex*.

Get the Facts for Yourself

We have hundreds of letters from users in our offices that show some very remarkable facts. They are not edited. The letters stand just as they were written.

If you are a truck user and want to read these letters write us and we will send them to you for your private perusal. For ethical reasons we do not care to publish them.

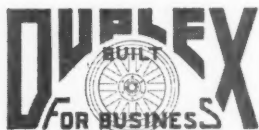
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Duplex 4-Wheel Drive

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Annual Convention of the National Lime Association at New York City, June 17 and 18

Probably at no other time has there been so great an interest in the matters to come before this convention. The eyes of the industry are focused upon the "doings" at this important event. There is thus created an unusual degree of interest in the complete report of the proceedings which will be published in

EXTRA!!! Added Feature

Nathan C. Rockwood, editor of ROCK PRODUCTS, has just completed a tour of the Pacific Coast States, during which he visited many of the important cement, lime, stone and sand and gravel plants in these localities. The story of this trip will contain much of interest and significance to all readers and advertisers. It will appear, with ample and interesting illustrations, in a

"Pacific Coast States Special" in conjunction with the Annual Lime Convention Report Number

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Issued July 3rd

Since its foundation in 1902 ROCK PRODUCTS has been the only periodical devoted to lime production. It has come to be the voice of the lime industry. Here is a market of immense volume for the manufacturer of machinery and equipment used in quarrying, conveying, grinding, pulverizing, calcining, hydrating, bagging and loading. And here in this big Special Convention Report Number is the manufacturer's single best opportunity to interest the buyers throughout this industry in their products. Use large space to command attention and to obtain maximum results.

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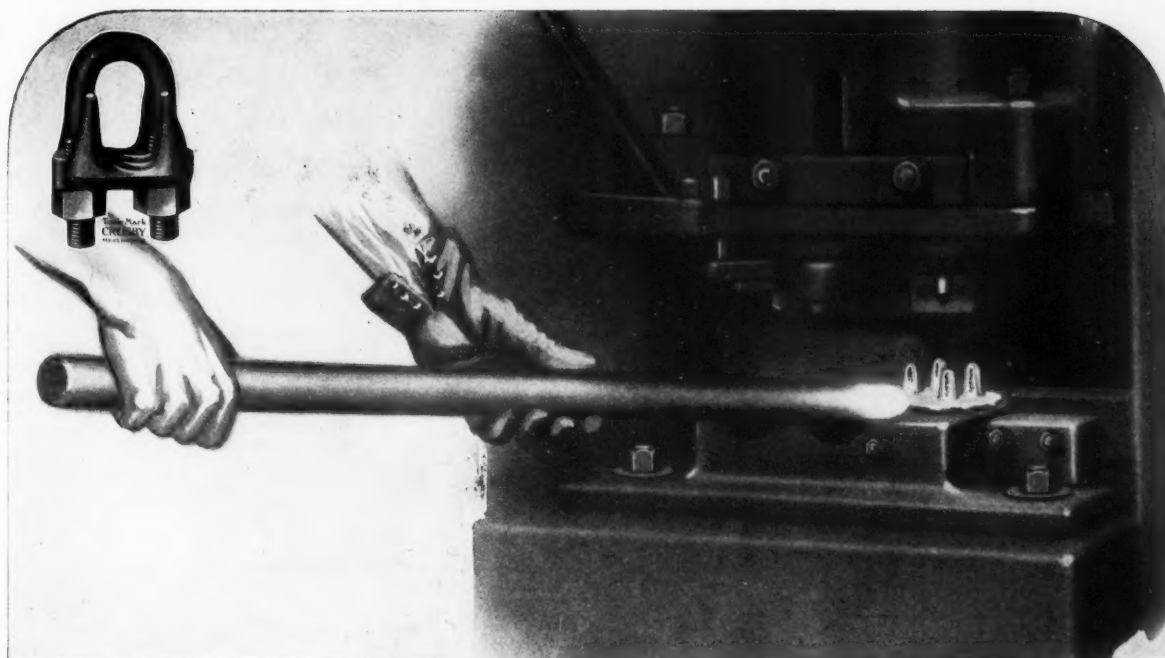
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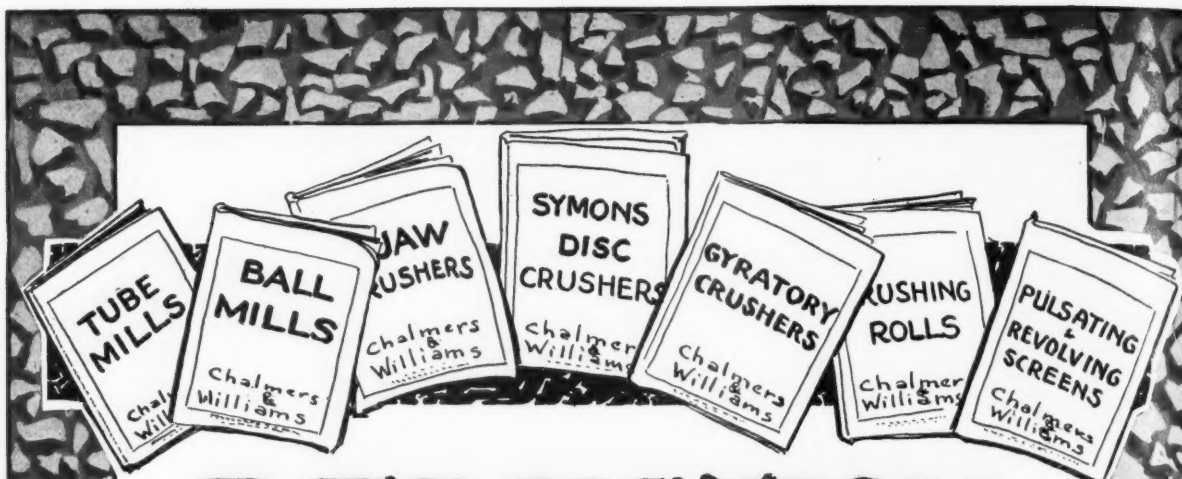


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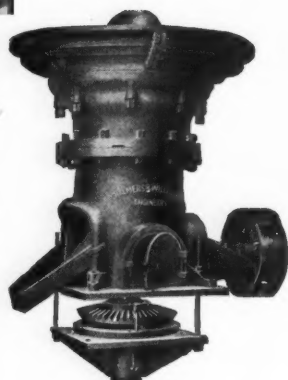
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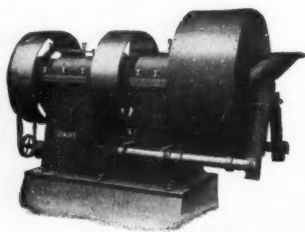
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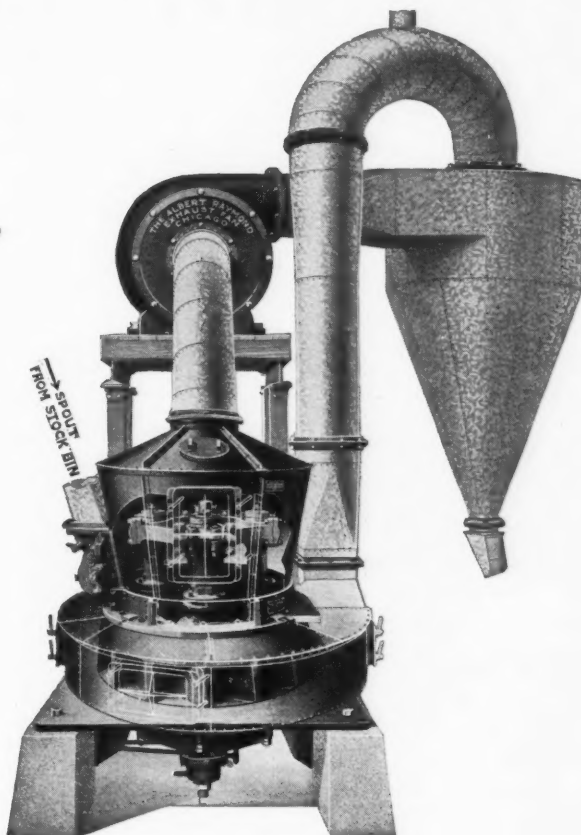
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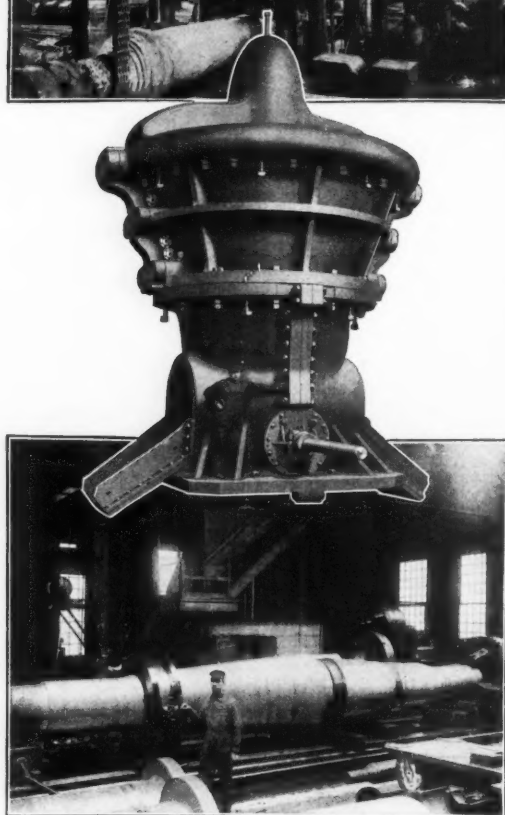
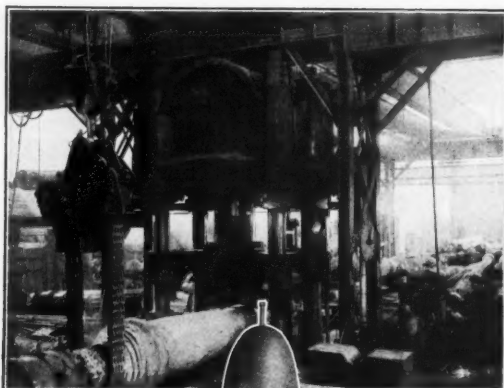
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Building Two Great Crushers

With 54-inch Openings

Forging the Main Shaft



Hollow Boring the Main Shaft

This is the third of a series of "Progress Photographs" taken during the construction of the two

Largest Crushers Ever Built by This Company for One of the Largest Copper Mining Companies in the World.

Our last advertisement in the May 22 issue stated that the size and equipment of our modern foundry permits of making castings for crushers of even greater size should there be an economic demand for same.

We now wish to emphasize the fact that not only can we undertake such large work as heretofore illustrated and described, but we can and have designed and built a large number of complete crushing and cement plants for all parts of the world.

We also call special attention to our large forging plant (shown in insert) equipped with one hydraulic press exerting a pressure of 3,000 tons and one exerting a pressure of 1,000 tons, for making the large forgings; also a number of large steam hammers for making the smaller forgings.

The forgings for the main shafts of these large crushers were made in the 3,000-ton hydraulic press. A forging of this large size made by the hydraulic press process is far superior to one forged under a steam hammer, because the effect of pressing upon the metal extends deeper into the material, giving a superior texture to the interior of the forging.

We also wish to lay stress upon the fact that Allis-Chalmers forgings of this large size are hollow bored to permit of thorough inspection of the metal at the center.

Even larger crusher shafts can be made in our Forge Shop, having made forgings with a diameter of 48 inches and weighing 40 tons.

A crusher shaft made by the Allis-Chalmers Manufacturing Company is a definite assurance of superior quality and strength and one that can be relied upon to stand up against the maximum strain for which it was designed.

Further details will be given in the July 17 issue.

Send for Bulletin No. 137-C



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Rock Products

Vol. XXIII

Chicago, June 19, 1920

No. 13

Large Southern Limestone Quarry

Both Cut-Stone and Crushed-Stone Operations by the Foster-Creighton Company at Rockwood, Alabama

ONE OF THE LARGEST QUARRY OPERATIONS of the South is that of the Foster and Creighton Co., whose main offices are in Nashville, Tenn., and whose largest plant is at Rockwood, Ala.

The little town of Rockwood, which has a population of 150, is entirely upon the company's property and all of the buildings are owned by it. The town's sole sustaining industry is the quarry operation. The company rents homes to its employes for small amount and takes charge of the up-keep. All commodities necessary for the homes are purchased from the company commissary.

The Foster and Creighton Co. owns 11 tracts of quarry property in the neigh-

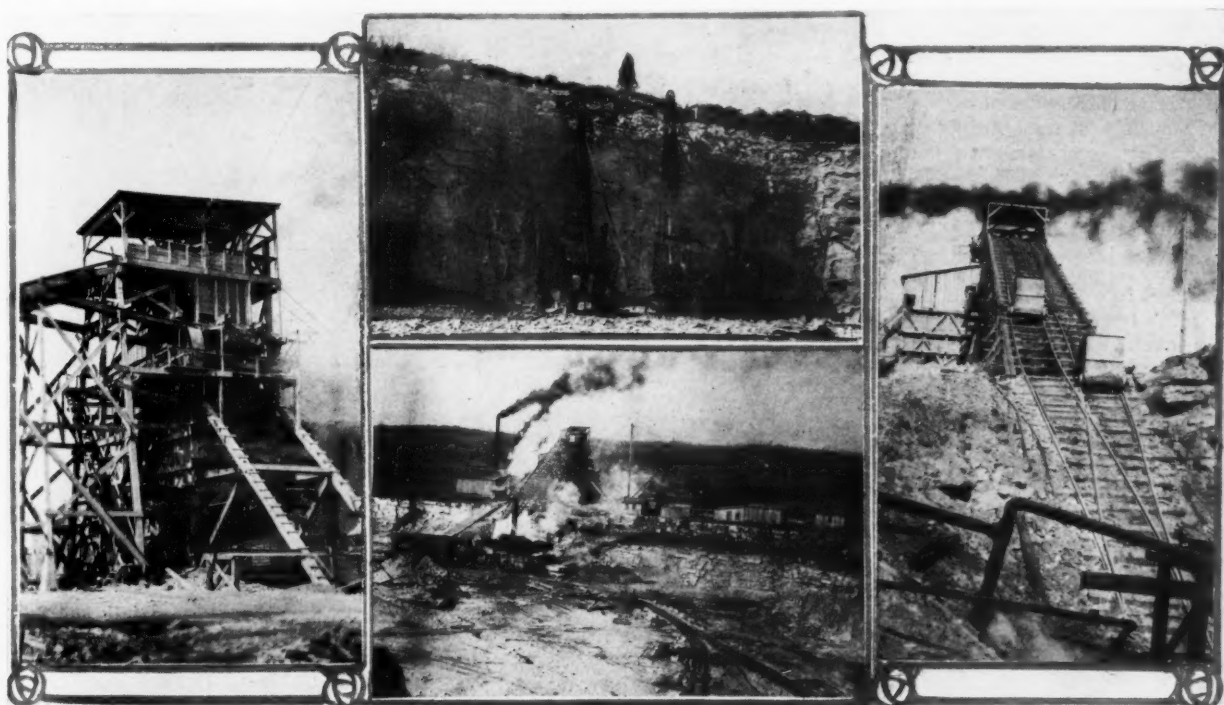
borhood which in the aggregate consists of 2,200 acres. Both crushed stone and dimension stone quarries are being operated. A considerable portion of the stone is a fine granular, very white oolitic limestone which is soft enough when quarried to be easily cut into good building stone, and has been sold throughout the South for many years.

The company has just opened one of its most valuable cut-stone quarries, a 11-acre tract that is one and one-half miles east of Russellville, Ala., and one-half mile from the railroad, and contains two million cubic feet of building stone. This stone has been thoroughly tested and a quarry face of from 25 to 30 ft. is

assured. The deposit is a hill formation with but little overburden and the bare surface of the rock shows no fissures or bad seams as is very characteristic of the neighborhood.

Difficulties in Cut-Stone Operation

In the last few years, this company has opened three small building stone quarries, two of which were abandoned on account of a large number of solution channels, filled with clay. This condition does not exist, where the overburden is hard rock, but the cost of removing this overburden is more than the loss resulting from the solution channels. The waste blocks are sold as "heavy rip-



Various views of the quarry and crushing plant of the Foster-Creighton Co., Rockwood, Ala.

rap" for Mississippi River improvement work.

Crushed Stone Most Important

At present the largest part of the operation is crushed-stone production. The crushed-stone quarry has a face 1700 ft. long and about 70 ft. high. In the past this has been operated in several benches, but in the future it will be operated as a single bench. The deposit is entirely above the surrounding ground level so that the crushing plant is practically on the same level with the quarry floor.

During the war the Government took over this plant to obtain limestone for the Muscles Shoals Air Nitrate plant and during that time considerable stripping was done by steam shovel.

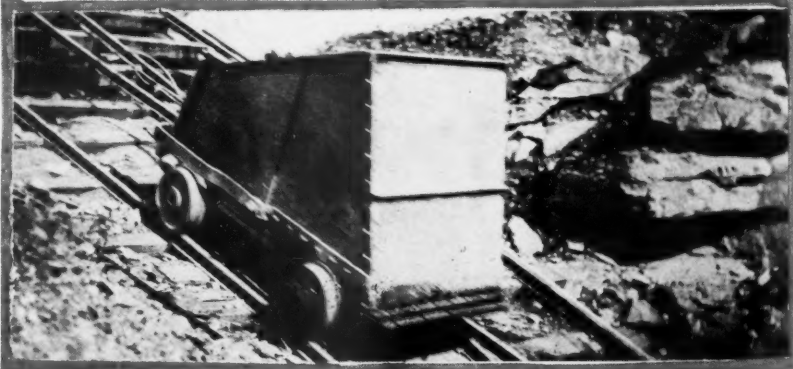
The top 50 ft. of the crushed stone quarry face is a tough limestone. The 20 ft. below this is a white soft oolitic stone of very high calcium carbonate content. And again below this stratum is a layer of the hard stone. It is estimated that below the present quarry floor there is at least 90 ft. more of good hard stone.

Quarry Operation

Drilling is done with two large well drills which make a 5-in. hole. In preparing for a shot, the holes are spaced about 10 ft. center to center and two rows of holes are drilled; the rows being staggered. As is the case in most Southern quarries, the ordinary blasts are much heavier than in similar Northern operations. Enough powder is used to blow the stone entirely out of place and to break it up considerably, in one operation, instead of just dislocating the stone, and plug-drilling the boulders.

The method of transporting stone to the crusher is quite different than that in general practice. Three No. 18 B traction type full revolving steam shovels are being used to load the stone. These light machines with a 1-cu. yd. dipper are very quick acting and since the stone is well broken up, and well separated from the ledge they operate quite effectively. This size unit was selected as the most economical to operate with the size of crusher selected. It was considered best to add more units to increase production rather than larger sizes.

The tracks from the crusher radiate out so that each shovel loads on a separate track. Three small dinkeys transport the stone to the crusher hopper. Instead of hauling long train loads the operation is based on a one-car unit. The haul to the crusher is very short



Quarry, primary breaker and skip hoist to scalping screen

and each dinkey hauls but two cars—one of which is used for operation and the other is an emergency car in case of breakdown. The cars are of a 4-ton side-dump type.

When one car has been loaded, it is hauled to the crusher; a switching track is provided which enables the engines to pass one another at the crusher.

Crushing Plant

A 30 by 42-in. jaw crusher is mounted below the quarry floor so that the cars may be emptied into it from either side. The run-of-quarry, which is of a rather square-cornered block nature, is reduced to 10-in. material in the primary breaker, and falls into a hopper below the crusher.

A view of the incline shows the type of car used to elevate the material to the recrushing and screening plant, and the construction of the incline. The cars are filled from the hopper below the primary breaker and elevated to an initial shaking scalping screen. This has been described in the "Hints and Helps for the Plant Superintendent" department of an earlier issue of *Rock Products*. The function of this screen is to eliminate all material below 3-in. which immediately falls into a car and is sold as a fluxing and agricultural limestone. This being quite a blast furnace district, one of the big and continuous demands is for fluxing stone.

Because of the necessity of producing this material without interruption the company has taken unusual precautions to ensure partial operation under all possible conditions. Duplicate parts are constantly on hand. Shelters are provided when possible, and the few men exposed to the weather are provided with slickers and boots. A stiff-leg derrick and skips are reserved in case of a breakdown of the initial crusher or incline. In such an emergency it would be necessary to hand load the skips in the quarry and hoist them to the shaker screen hopper by the derrick. In this manner a limited amount of stone could be produced—thus preventing the necessity of a shut-down. Except on a very few extremely bad days, this plant has not been shut down for ten years.

The stone rejected from the shaking scalping screen, which is all over 3-in. material—goes to a No. 7½ gyratory crusher. The product of this crusher is elevated by a steel-pan conveyor to a cylindrical sizing screen where the commercial sizes are made.

Rejections of the sizing screen go to a No. 6 gyratory crusher. A No. 5 crusher has also been installed but it has never been used.

As previously stated, there is a 20 ft. face in the quarry which is a soft oolitic limestone about 99 per cent CaCO_3 . In crushing, it is estimated that one-third

of this is reduced to screenings, and so with this arrangement most of this soft high carbonate stone is either left in the fluxing stone or is reduced to agricultural limestone screenings. It is collected by a jacket on the cylindrical sizing screen.

At present the plant is operating with a daily capacity of about 750 tons, but the addition of another shovel and dinkie in the quarry will considerably increase the present output. As the demand for stone increases the capacity of the plant

will be increased to 1,000 tons per day.

Officers

W. F. Creighton is president and general manager, Edwin Warner is vice-president of the company. R. T. Creighton, who for many years was the president, and who was largely instrumental in building up the business of the present plant, is chairman of the board of directors. R. M. Dudley and James Dunbar are also on the board of directors.

Bedford Agricultural Limestone

Pioneer Indiana Industry Builds Up Large Business With Dimension Stone By-Product

HAVING STARTED the production of agricultural limestone in 1907, the Bedford Stone Products Co., Bedford, Ind., rightly claims to be a pioneer in the agricultural limestone industry in Indiana. John Laughlin, owner and general manager, organized the company and built the first plant at Williams, Ind., in 1907. The fact that Mr. Laughlin gave up the practice of medicine to enter the agricultural limestone business shows that he had faith in the industry even at that early date. Later this property was sold, and a plant at Bedford, Ind., was built in 1913. In 1915 a second plant was built at Oolitic, Ind., and in 1917 a third was added at Dark Hollow, Ind.

Each plant has practically been a duplicate of the one built in 1913. Each has a daily capacity of 100 tons of 10-mesh material. It is claimed for the oolitic stone of the Bedford district, that it is 98 per cent calcium carbonate and it is very soft when first quarried. The stone is widely used in the glass industry where a white, pure calcium carbonate of constant composition is desired.

The raw material used is the waste from the dimension stone business. In quarrying the Bedford stone the large

blocks are sent to the cutting and planing mills. Here they are sawed and shaped to various dimensions. The large waste pieces of stone are used as a fluxing stone and are shipped to the blast furnaces. But the small chips and spalls are loaded on flat cars and sent to the Bedford Stone Products Co.

This stone is unloaded by hand and fed into an 18x24-in. single-roll crusher. The product of this machine is recrushed in a No. 2 Gardner pulverizer so that 100 per cent of the material will pass a 10-mesh screen. The plant capacity is 100 tons per 10-hour day. All machinery and elevators are electrically operated. As fast as the material is pulverized, it is elevated and loaded into box cars.

The plants are operated the year around. This is made possible because of the demands of the glass industry and because a special effort is made to market the product in the off season.

The company believes in direct advertising and keeps an up-to-date list of 5,000 farmer prospects who are sent literature and suggestions as to when to lime the soil and how to do the liming. It is found that by increasing the advertising effort in off seasons, the all-year output of the plants may be sold.



Agricultural limestone plant of the Bedford Stone Products Co., at Bedford, Ind.

Design of Sand and Gravel Screening and Washing Plants

II. Determining Size of Proposed Plant — Stripping — Excavation — Pumping — Transporting

THE FIRST OF THIS SERIES of articles, begun in the issue of June 5, covered many points governing the selection of a sand and gravel deposit for development. The second installment, herewith, begins the consideration of some of the operating details.

Determining Size of Proposed Plant

The question of size and capacity of a new installation is determined by the amount of capital available, the extent of the market which can be reached, and the acreage of the gravel land. From the investment standpoint there is a minimum limit and from the commercial a maximum limit in every locality. At points where the average cost of production and market prices prevail, the small plant producing 200 to 300 cu. yds. per day is a very poor investment. The cost of operation, maintenance and overhead usually equals the income from such small tonnage. Even where very careful and wise management result in more or less profit at the end of the year, the fact must never be lost sight of that when the owners have exhausted their deposit, the salvage value of their plant and machinery is little or nothing.

There are of course exceptions to the above conditions where very high market prices prevail, or where through extraordinary physical conditions, the material can be excavated and prepared for the market at less than the average cost of production. It has been found that with very few exceptions, the stockholders could invest their money otherwise to much better advantage, than in a plant producing less than 300 yds. per day.

On the other hand, to build a plant of twice the above capacity does not represent more than 25% or 30% greater investment and costs very little more to operate. Although the cost of maintenance probably increases very nearly in proportion to the added capacity, yet the increased opportunity for profit is evident, and so on up the scale, the larger capacity plants represent more profitable investments, providing the market and acreage justify them. These facts have been confirmed by the largest and leading sand and gravel companies of the country who are operating several plants all of which are producing from

50 to 100 cars per day per plant. In other words the sand and gravel producing game is a big one, where the small plant must be quite isolated to succeed.

There are, therefore, no set rules for determining the capacity of a new plant except to make it as large as the finances, market and acreage will justify. If the size of the plant is governed mainly by the market, a larger market than the present one can always be anticipated, owing to the constantly increasing demand for sand and gravel in all localities. This anticipated market should always be considered, for a small plant enlarged is never so efficient as one of the capacity for which it was originally designed. When overloaded or crowded to a larger output it always results in many

Blue clay is probably the hardest impurity to separate from the gravel. The writer has seen pits containing blue clay that instead of dissolving in the washing water, would roll into balls in a revolving screen, increasing in size as they passed through the screen, like a snow ball rolling down hill. The result was that on some days, the screens would be screening tough balls of blue clay along with the gravel, which necessitated many tons of otherwise excellent material being wasted. Such overburden, regardless of the thickness, of course should be thoroughly stripped.

Most stripping is done with steam shovels. Dragline plants sometimes strip with their drag buckets but such plants usually dig so deep below the



Hydraulic stripping of a sand and gravel deposit

shipments being rejected on account of dirty or poorly graded material.

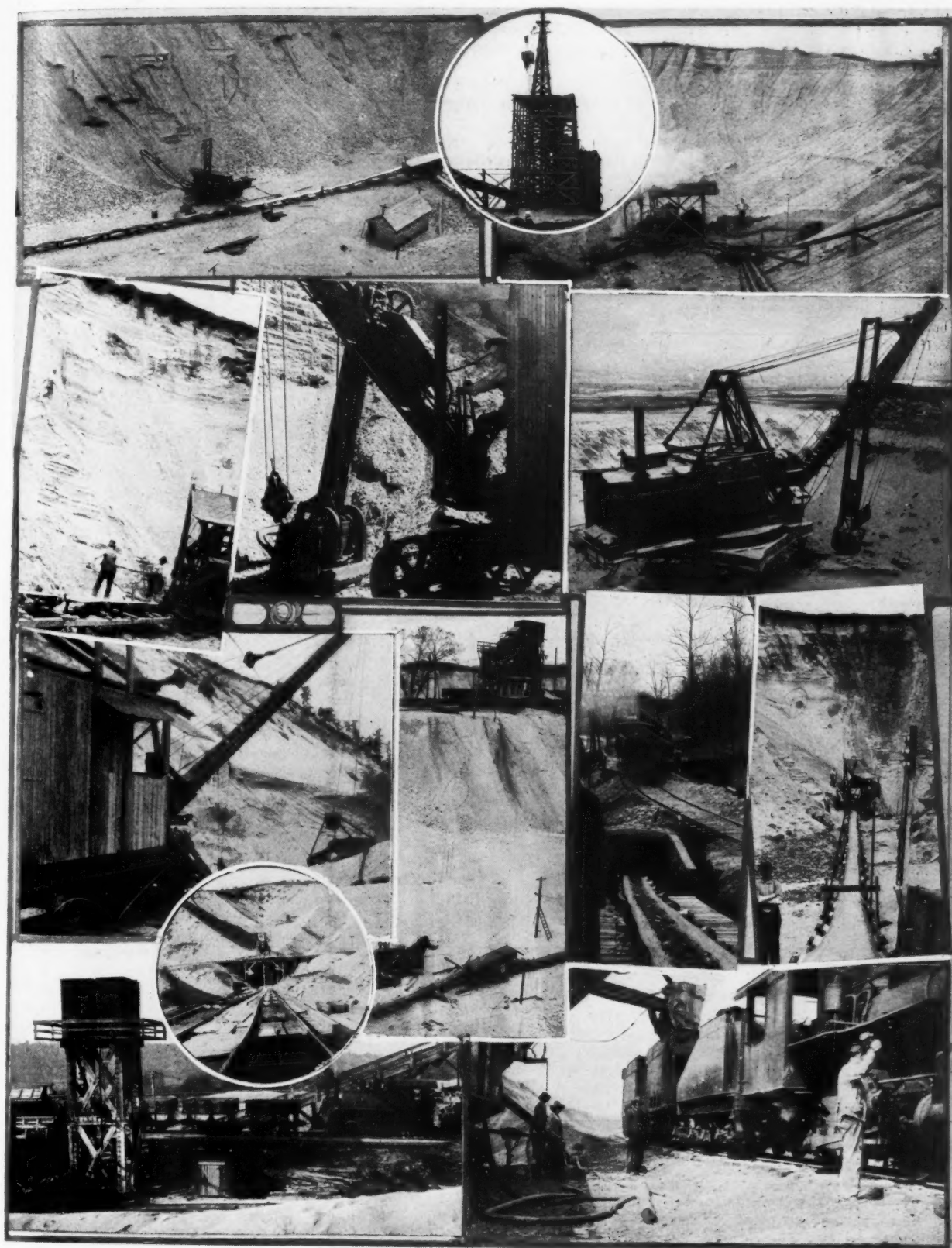
Stripping

In most gravel banks the overburden is so thick in proportion to the face of the bank, that stripping is necessary. When overburden exceeds more than 4 or 5% of the depth of the bank, it should be stripped, as the amount of soil would be too great to be entirely washed out in the plant. This percentage of course is governed by the amount of additional impurities occurring through the material to be eliminated, the nature of these impurities, and the rigidity of the market requirement.

surface of the ground that the overburden is carried through the plant.

Hydraulic stripping is by far the most economical method, whenever it can be used. Not only is a sufficient available water supply necessary, but low ground of considerable extent must be near to receive the water and silt. The water supply can usually be had, either from a nearby stream or from a number of deep wells. The pit sites whose topography contain enough low-lying area of sufficient extent to receive much overburden are limited.

Hydraulic stripping is accomplished by means of a 3-in. or 4-in. pipe line, carrying water under a good head, a couple



Typical sand and gravel pit operations in the Middle West and East

of lengths of fire hose, a nozzle and two men to handle the nozzle. A ditch is first dug from the edge of the area to be stripped to the low ground, after which the water laden with overburden, will make its own ditches and find its way to its destination by gravity.

Throughout the northern states, where sand and gravel washing plants must cease operation during the winter months, all stripping as far as possible should be done at this time. This not only furnishes work for part of the employees during the idle months, but eliminates the necessity of giving attention to this very important feature of sand and gravel production during the busy season.

If, as in most banks, a steam shovel is used for removing the overburden, the completing of all necessary stripping during the winter months relieves the shovel for excavating saleable material during the operating season and often results in the elimination of purchasing an extra shovel. The writer has witnessed several large plants, which were temporarily standing idle during the busiest time of the year, waiting for the stripping crew to get far enough ahead of the excavating crew for the latter to proceed. This expensive delay could of course have been avoided, had the stripping been completed during the winter months for the following season's run.

Excavating

There are several successful and accepted methods of excavating the material from the pit, the advantages of each depending upon the physical conditions encountered. Here again the steam shovel is most generally used, because in the majority of large banks, an ample working face, say 20 to 40 ft. is exposed, between the overburden and water level, to justify its use. Where such a working face does not exist, cableway excavators and dredges are the accepted methods. The drag-line or cableway excavator is often used before water is reached, but its most successful application has always been where at least part of the working face is under water.

Dredges of different types are used, consisting of pump boats, ladder dredges, clam-shells, orange-peels, dipper and drag buckets mounted on booms. All except the first method require that the material after being excavated, must be loaded on auxiliary barges, which are towed to shore and the material rehandled into a receiving hopper, which feeds to the plant. These methods all operate with similar efficiency in different localities, and their adoption in the larger producing districts is more or less the result of following the local common practice. Although such reasons may indicate some lack of individuality or resourcefulness, yet

there is an advantage in operating equipment with which local labor is familiar.

Pumping

The writer's observations, however, have indicated to him that the pump boat is a very efficient unit on account of the elimination of labor. A centrifugal pump of manganese steel construction, mounted on a comparatively small boat, driven by an electric motor or by a steam engine, with an intake pipe long enough to reach the depth of the marketable material and suspended by a boom, forms this type of dredge. Hoists to handle the boom and spuds, and to move the boat, complete the equipment on deck. At the lower end of the intake pipe a revolving cutter, which also acts as a strainer, admitting only stones which are not too large for the pump, loosens and agitates the material. This cutter is also made of manganese steel, or at least has manganese blades. The pump boat is connected to the shore by a pipe line containing several rubber joints for flexibility and is supported on pontoons.

The rehandling of the material at the shore, before going into the receiving hopper, however, is necessary in order to de-water it. As a centrifugal pump will handle only 12% to 20% of solids, the quantity of water received with the material will flood any feeding arrangements from the receiving hopper.

There are in use, water-tight receiving hoppers which act as a sort of settling basin, from which an elevator extending into it lifts the material while the water overflows. This scheme has variable success, the main objection being to the heavy wear and tear on the machinery operating under water in the presence of so much sand and grit. A very successful method is to pump the material from the dredge into a pile on the bank or into a basin with sides high enough to prevent the wasting of too much sand through the overflow. From this pile or basin the material is reclaimed by a clam shell which puts it into the receiving hopper of the plant.

In several operations, where bin storage can be eliminated to save height, the material is pumped direct to an elevated receiving hopper, which feeds direct to the screens and uses the pumping water for washing water. Naturally pumped material does not require as much washing at the plant as material excavated dry. This latter arrangement can only be used where the distance of the pump boat from the shore is so short that the combined heads resulting from the long pipe line and the elevation to the top of the plant, do not exceed the power of the pumping unit.

Transporting

Transporting refers to the means of moving the material, after being excavated, to the receiving hopper of the

screening and washing plant. This operation in connection with the various dredging and cableway methods of excavation described above, has been fully discussed under those subjects. The steam shovel, however, which, as stated before, is at present in most common use for digging the raw material out of the bank, must be served by some separate means of transportation to carry the material to the receiving hopper at the plant. The two accepted carriers for this work are the field conveyor and railway dump cars.

Field conveyors have seldom given full satisfaction because they must be moved and lengthened so often. A field conveyor must necessarily be a portable unit, made up in sections, which can be easily moved. The belt conveyor is the only suitable type for handling sand and gravel from the standpoint of first cost and adaptability. A belt conveyor to operate successfully must be in perfect alignment, which is almost impossible to maintain in a long portable unit of any sort. Therefore, railway dump cars are almost always used.

The cars are ordinarily operated in trains of three or four cars each, according to the capacity of the plant, the size of the cars and the length of the haul. Cars of about four yards capacity are generally considered large enough for efficient service. Larger cars are so heavy when loaded, that the cost of track maintenance has proven them impractical in many instances.

The cars are hauled by steam, gasoline or electric locomotives, the first being in most common use. These locomotives must be heavy enough to climb a fairly steep grade. As will be shown later, the top of the receiving hopper into which these cars must dump, must under ordinary circumstances be 15 or 20 ft. higher than the bottom of the pit. In long narrow banks, which line up with the plant, or in opening new pits, a hoist placed at the receiving hopper can often be used to pull out the cars either up the incline or all the way from the shovel. This at best is only a temporary arrangement, lasting at most only one season in an operation of any size.

Side-dump cars are most commonly used to serve the shovel, made up in two trains, each with a locomotive. This of course necessitates a switch and passing track somewhere. Various devices are possible to automatically dump the cars after the chains have been released. This can be done by simply giving one rail a greater elevation than the opposite one at the dumping hopper. Just beyond the hopper, the opposite rail is raised, to right the car bodies again. At the larger plants standard gauge equipment is used, to correspond to loading tracks.

(To be continued)

Gravel Ballast Policy of the Pennsylvania Lines West

W. S. Cushing, Former Chief Engineer of Maintenance, Makes Distinction Between Plants Designed for Ballast Making as a Principal Product and as a By-Product—Essentials of a Successful Ballast Plant

IN CONNECTION with the investigation of crushed-stone and gravel plants by the ballast committee of the American Railway Engineering Association, reported in *ROCK PRODUCTS* March 27, 1920, pp. 27-30, W. S. Cushing, engineer of standards, Pennsylvania Railroad, Philadelphia, Pa., formerly chief engineer of maintenance of the lines west of Pittsburgh, supplied the following data:

Examples of Successful Plants

"The most successfully operated plants that we have investigated are in Ohio and Illinois. The first two plants referred to (1) and (2) are operated by a large Ohio sand and gravel company which has had many years' experience in supplying railway ballast. The next two plants (3) and (4) are in Illinois and are operated by a Chicago company which has likewise had much experience in ballast production. The fifth plant (5) is a rather typical city sand and gravel operation.

"Plants (1) and (2) have concentric or jacketed screens mounted on trunnions driven by rack and pinion and are in my opinion best suited to a combined railroad gravel ballast and commercial concrete aggregates business and are designed especially to conduct such a combined business. Their capacity for the same size of plant is in excess of that of the other designs, they are simple in design, and their cost per ton of production is, we believe, less.

"Many years of specializing along gravel ballast and concrete aggregate lines by the operator of plants (1) and (2) has produced a plant, which in our opinion, is particularly suited to this trade.

"Plants (3) and (4) are provided with rotating cylindrical screens mounted in tiers on as many inclined supporting and driving shafts as there are screens. These plants are well adapted to concerns whose principal business is the production of commercial concrete aggregates and with which railroad ballast is incidental. Plant (5) has Dull (conical) screens and is especially adapted to commercial sand and gravel production with railroad ballast as an incidental.

Advantages of First Two Plants

"Plants (1) and (2) differ from the

others in that the washed products go either into storage bins directly over tracks or direct into cars under the bins. Having the loading bins over the tracks instead of adjacent to them, as in the case of all the plants excepting (1) and (2) has advantages, one especially being that much less length of incline in the bottoms of the bins is required since the tracks are immediately underneath, resulting in a minimum height to which the gravel has to be elevated and effecting therefore a constant saving in power.

"Again by the use of so-called butterfly valves or gates a greater number of separations or combinations of products can be made in plants (1) and (2) than in all the rest.

More Economical to Buy

"In our opinion it is more economical to buy from commercial producers than to build and operate our own plants, since in most pits the percentage of sand is so high that the waste is excessive, resulting in a cost per ton in excess of what we can buy washed gravel for from commercial producers. However, in the case where the railroad owns a pit it is more desirable and more economical to build our own plant and have it operated by a commercial producer skilled in the art, who can combine a commercial trade with the ballast business. Not only is everything produced used, for which there is a market, but running the plant under a proper agreement gives us the controlling factor and enables us in event of unsuccessful or unsatisfactory operation, to terminate the arrangement and then either to operate it ourselves or get some other commercial operator to do it.

Fundamentals of a Successful Plant

"The fundamentals of a successful railroad ballast gravel plant should provide for the following:

"(1) A design which would make the lift of the raw materials a minimum and thus effect a constant saving in power.

"(2) Provision for a combined concrete aggregates business and railroad ballast business. This enables the maximum amount of the deposit to be utilized with a subsequent lowering of cost for the gravel ballast. It is, of course, under-

stood that the railway company also reserves the right to buy concrete aggregates at a certain fixed unit price.

"(3) If the proper commercial operator can be found it is better to have him operate a railroad-owned plant since he is skilled in the art, has a personal financial interest in keeping the costs low and because he can develop a commercial market, all of which will mean added revenue in freight to the railroad. Again his experience will enable him to operate the plant much more efficiently than a railroad could, for the railroad has so many varied interests to supervise and is therefore unable to watch the details as a commercial operator would.

"(4) If the above conditions cannot be brought about it is better to buy ballast from commercial producers if they are located on your own railroad or are not so far from that road as to make the freight charges a prohibitive factor.

Ben Stone Urges Patience

In his June 5 weekly bulletin to members of the Illinois Sand and Gravel Producers Association, Ben Stone, business manager, writes in a similar vein:

If it is true that an optimist is one who doesn't care what happens so long as it doesn't happen to him, then we have not much cause for smiling. The sun is simply not shining around the sand and gravel plants, and there is no indication of a rift in the clouds. The Interstate Commerce Commission has issued certain drastic and unusual orders intended as an opening wedge in the freight jam, and some of them have been freely and severely criticised. It may be, perchance, that we are somewhat impatient of results. It should be borne in mind that the situation is extremely unusual. It is not merely that there is a shortage of cars—in some localities the reverse is hindering free movements. There are a number of contributing elements which go to make up a very positive shortage of transportation, and general relief will not be had until all of those difficulties can be removed. In the meantime it is the duty of every shipper to lend his efforts to establish and carry out a co-operative program, bearing in mind that the Interstate Commerce Commission and the American Railroad Association occupy positions overlooking the entire situation and must be depended upon to handle it with a view to accomplishing the greatest good for the greatest number.

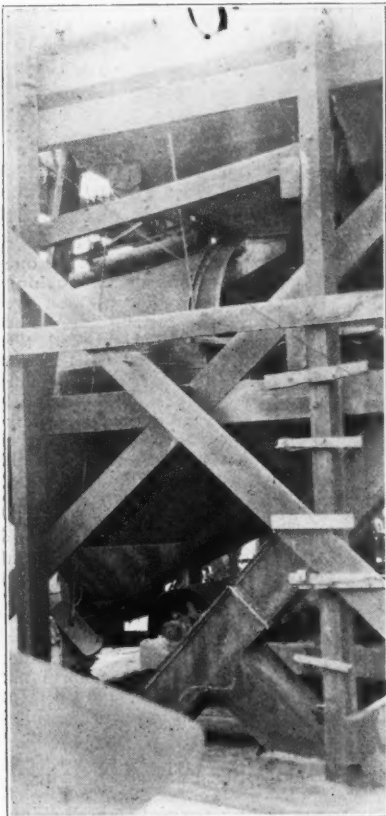
Hints and Helps for the Plant Superintendent



Compact Screening Arrangement for River Operation

THE ACCOMPANYING view shows the compact screening arrangement aboard the sand and gravel river dredge of the E. T. Slider Co., Louisville, Ky. On board a boat, of course, one of the big requirements is the saving of space and so the screening layout is designed to take up the minimum of floor room.

The screens are of the Gilbert type and are mounted one above the other. The rejections from one being gathered at the discharge and chuted to the head of the one below. Steel pans below each screen collect the particles which pass the screen.



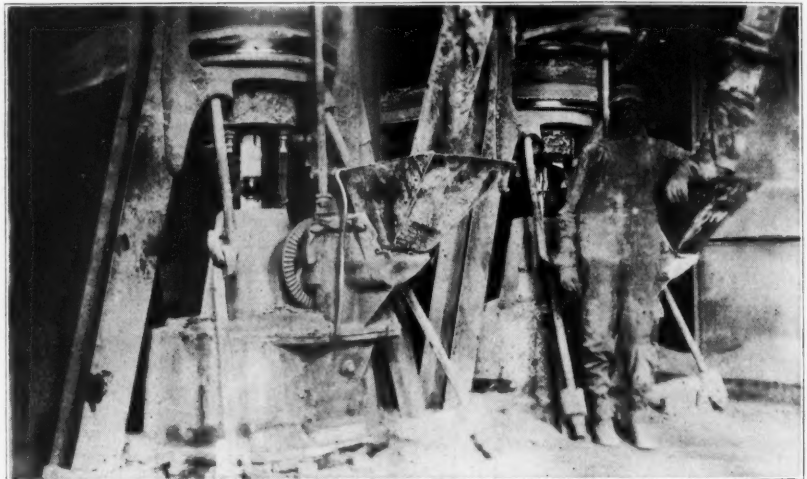
Compact screen arrangement, or nesting, for economy of space on sand and gravel dredge

Vertical Motors Increase Efficiency of Mills

A VERY GENERAL CHANGE is being made in the drive of the pulverizing machines which have vertical axes. The old horizontal motors and quarter-turn drive belts are being replaced by new vertical motors which enable the direct alignment of drive and

steel pans on it. The power required is $2\frac{1}{2}$ h.p. Two boys handle the machine and load the cars.

This company has experimented considerably with box car loaders and has come to the conclusion that 14 ft. is the best length and that a 12-in. belt with steel pans will give a bigger capacity than a wider belt without pans and that the operating trouble is much less.



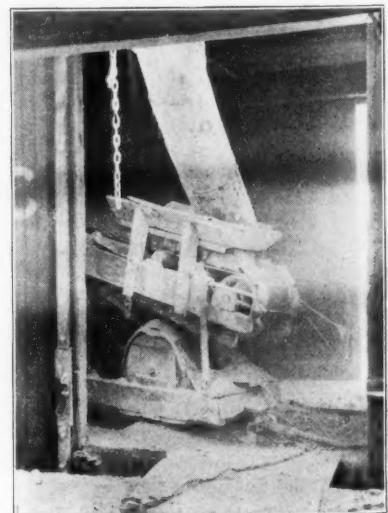
Vertical electric motors driving limestone mills

machine. It being granted that a vertical and horizontal motor can be operated with the same per cent of efficiency, the saving to be gained both in power and prolonged life of belt by using vertical motors is found by experience to be considerable.

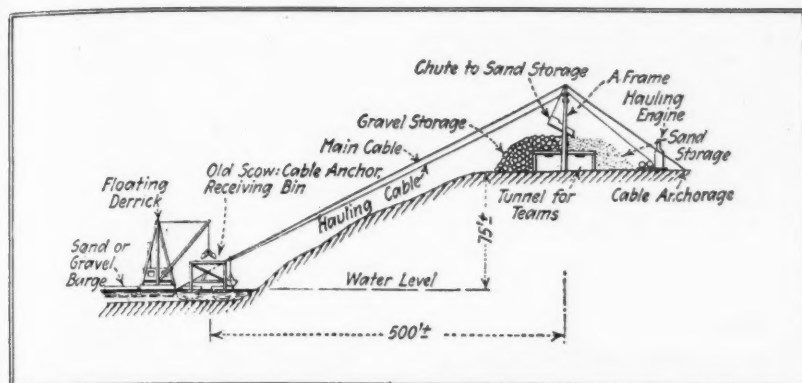
Loading Bulk Lime

THE GAGER LIME CO., Sherwood, Tenn., has designed its own box car loader and built an arrangement whereby a 30-ton car can be filled in 20 minutes. The arrangement, as illustrated, consists of a very large suspension scales, a chute to the car door and a box car loader. The hopper of the suspension scales has a capacity of 8,000 lbs. and is filled by gravity from the storage bins.

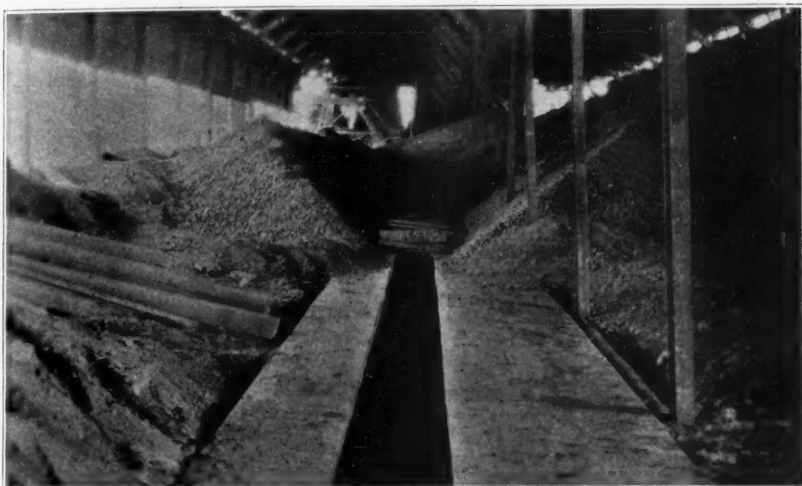
After this weight is recorded the lime is fed onto a box car loader as fast as it will carry the lime away. The loader is 14 ft. long and has a 12-in. belt with



Home-made box-car loader for lump lime handling



Barge unloading and storage-handling for sand and gravel



Storage and handling layout for rock phosphate

Automatic Phosphate Storage

THE ACCOMPANYING VIEW shows the interior of a modern phosphate storage shed at the International Agricultural Corporation plant near Mt. Pleasant, Tenn. The material is delivered to the storage by a small electrically-driven end dump car, which runs on a track down the center of the building near the roof.

A traveling hopper mounted upon a track underneath the floor directs the stored phosphate to a belt conveyor when the boards above the hopper have been removed. The view shows the storage when it was about two-thirds empty. The material is worked to the conveyor by hand shoveling at present.

Clay Storage for Cement Plant

THE ACCOMPANYING view shows the interior of the large clay storage house at the Kosmos Portland Cement Co., Kosmosdale, Ky. It is the plan of this company to "harvest" all the clay needed for a year's operation during a few months in the summer when it is dry and store the material until used.



Clay storage methods at portland cement plant

The clay is delivered to the clay shed by small side dump cable-drawn cars upon a trestle which runs around the interior of the shed.

Upon the floor of the storage house there are narrow-gauge tracks upon

which a truck-mounted wagon loader is run as it cuts the clay out ahead of it. When the material is wanted, it is loaded into small cars behind the wagon loaders which run upon the same tracks as the loader and hauled to the cement plant.

Plant for Sand and Gravel Storage

UNLOADING Ohio River sand and gravel from barges and storing them at the top of a bank so as to be accessible to teams and trucks, is successfully handled by the plant shown in the accompanying sketch. This plant was designed and installed by the Western Rivers Co., Point Pleasant, W. Va. Sand and gravel have been unloaded and stored at the rate of 50 cu. yd. or more per hour. An old dump scow, sunk in the river to a chosen point, just below mean water level, furnished anchorage for the outer end of a cable-way rig, and also supported a loading hopper. The other end of the main cable was carried over a simple A-frame at the top of the slope, and anchored to a dead man. Sand and gravel, transferred from barges to the hopper by a floating derrick passed into a bucket, operating on the cable-way with a single hauling line and no hoisting, or main-fall line. The bucket was brought to the top of the slope and dumped by a small two-drum hoist. Upon reaching the frame the bucket engaged the end of a short chute, placed between the legs of the frame, and discharged directly into the storage pile. To dump into the gravel storage a trip line was attached to the bucket to overturn it at the desired point.

Merchandizing Mineral Aggregate

Birmingham Slag Company Puts Out Something Different from the Usual Business Card

MANY MINERAL AGGREGATE producers advertise their wares in the public press, but it is quite unusual to find such an advertisement anything more than a mere business card containing the words "Sand and Gravel," or "Crushed Stone," etc., and the firm's address.

Four things you can all advertise are price, quantity, quality, and service. This the Birmingham Slag Co., Birmingham, Ala., seems to have done most attractively in the advertisement below, which

has been running recently in the "Manufacturers' Record," a construction paper much read in the South.

This advertisement has the added value of containing news in the announcement that prices are guaranteed for the entire year of 1920. Attention was called to this step of the Birmingham Slag Co. in ROCK PRODUCTS of February 28, 1920, and many readers will be interested to see how this progressive producer is capitalizing his policy.

READ IT—HERE'S THE BEST PIECE OF NEWS—READ IT
YOU'VE READ IN A LONG TIME

GUARANTEED PRICE SCHEDULE FOR ALL SHIPMENTS MADE DURING 1920

ON

SCREENED—"ENSLEY BASIC SLAG"—CRUSHED

Desiring to render valuable service to those interested in proposed ROAD BUILDING, STREET PAVING and GENERAL CONSTRUCTION in the SOUTHEASTERN STATES, and particularly to help STABILIZE PRICES on BUILDING MATERIALS, we have established the following schedule of prices (f. o. b. cars Ensley, Ala.), which will be maintained throughout the year of NINETEEN TWENTY—

Please Use Size Numbers In Ordering

No. 1, For Good Roads	4 to 2½ inch	\$.95 per net ton
No. 12, For Good Roads	4 to 1½ inch	1.00 per net ton
No. 2, For Good Roads	2½ to 1½ inch	1.00 per net ton
No. 23, For Good Roads	2½ to ¾ inch	1.10 per net ton
No. 3, For Concrete	1½ to ¾ inch	1.25 per net ton
No. 34, For Concrete	1½ to ¼ inch	1.25 per net ton
No. 4, For Concrete	¾ to ¼ inch	1.25 per net ton
No. 5, For Good Roads	¾ to 0 inch	1.10 per net ton
No. 6, For Built-Up Roofs	¾ to ¼ inch	2.05 per net ton
No. 7, For Good Roads	¾ to 0 inch	1.00 per net ton

TERMS: The above prices carry a discount of 5 cents per ton if invoices are paid on or before the 15th of month following month of shipment. All quotations are made and orders accepted subject to delays, preventions, and to any and all causes beyond our control.

Mr. Contractor—Here are your Q's for success: Order "Ensley Basic Slag" and be assured of—

QUANTITY,

Our Ensley plant is the largest one crushing and screening Blast Furnace Slag in the United States. It is the largest plant in the Southeastern States producing a crushed and sized mineral aggregate and road metal.

4000 TONS DAILY CAPACITY.

Good Roads Slag...35 Cars.
Concrete Slag...40 Cars.
Roofing Slag...5 Cars.

DAILY TOTAL...80 CARS

QUALITY and

"Ensley Basic Slag" is a scientifically prepared Blast Furnace Slag. It is poured into our modified pits by the T. C. I. & R. R. Co. for air cooling, weeks later it is loaded by two (95-ton) Bucyrus steam shovels onto side-dump cars and moved over electric third-rail system to the crushing plant. Iron is removed by three magnetic separators during the process of crushing and screening. Four large revolving screens reduce it to ten standard sizes to meet specifications for all types of Roads, Streets and Concrete Construction.

QUICK SERVICE

All loads are weighed at our plant by a certified weighmaster (S. W. & I. B.) and delivered by our locomotives to the following railroads or their connections: L. & N., Southern, A. G. S., Frisco, Seaboard, Illinois Central, A. B. & A., Central of Georgia and Birmingham Southern. These facilities insure quick handling of all shipments, saving from one to ten days on deliveries.

Phone Wire Write

BIRMINGHAM SLAG COMPANY

Branch Sales Office:
No. 84 Marietta Street
ATLANTA, GEORGIA

HOME OFFICE:
Sixteenth Floor, Jefferson Co. Bank Bldg.
BIRMINGHAM, ALABAMA

Branch Sales Office:
Williams Bldg.,
THOMASVILLE, GEORGIA

Chart for Computing Loading of Flat Bottom Cars

By R. J. ALDEN

THE chart on the opposite page will be found useful in computing measurements for loading flat-bottom cars. It is theoretically correct and will not err more than one-half of one per cent in practice if instructions are followed.

Example

What is the height to load a certain car 9 ft. 3 in., wide 42 ft. 4 in., long? Capacity of car is 115,000 lbs., and weight of material is 110 lbs. per cu. ft.

Start at left side of chart on line at 9 ft. 3 in., follow curved line until it intersects the vertical line at 42 ft. 4 in. from this point; go straight to the right and stop at vertical line under 110; from this point follow incline line and stop at line under 115. This shows that 32½ in. is the height to load the car.

Should it be desired to increase the load 10% take 32½ in. at vertical under 100 and follow incline line and stop at line 110; this will give 35¾ in.

Rule

Start at left side on line corresponding to width of car; follow curved line and intersect at vertical line corresponding to length of car; then go straight to right and stop at vertical line corresponding to weight of material; then follow incline line and stop at vertical line corresponding to capacity of car; then straight to right on margin will be the height to load.

Cubic Yards

For computing the number of cubic yards we proceed as before except that we stop at line 100 in all cases.

Example

Take our first car 9 ft. 3 in. x 42 ft. 4 in. capacity 115,000 lbs.; weight 110 lbs. per cu. ft. How many yards in car?

Proceed as before on curved line and stop at vertical line under length of car, then straight to right and stop at line 100 from this point follow incline line until it intersects line at 32½ in. This shows that there is slightly less than 39 yds. in the car; actual figures give 38.84 cu. yds.

How high shall we load a certain car 8 ft. 4 in. x 38 ft. 3 in. so as to contain 30 yds.?

Proceed as before and from the vertical line 100 follow incline until it intersects vertical dotted line over 30; this shows that 30¾ in. is the height to load.

While the foregoing describes a ready method of calculating the contents of a car, it doesn't by any means take the place of track scales at the plant.—Editor.

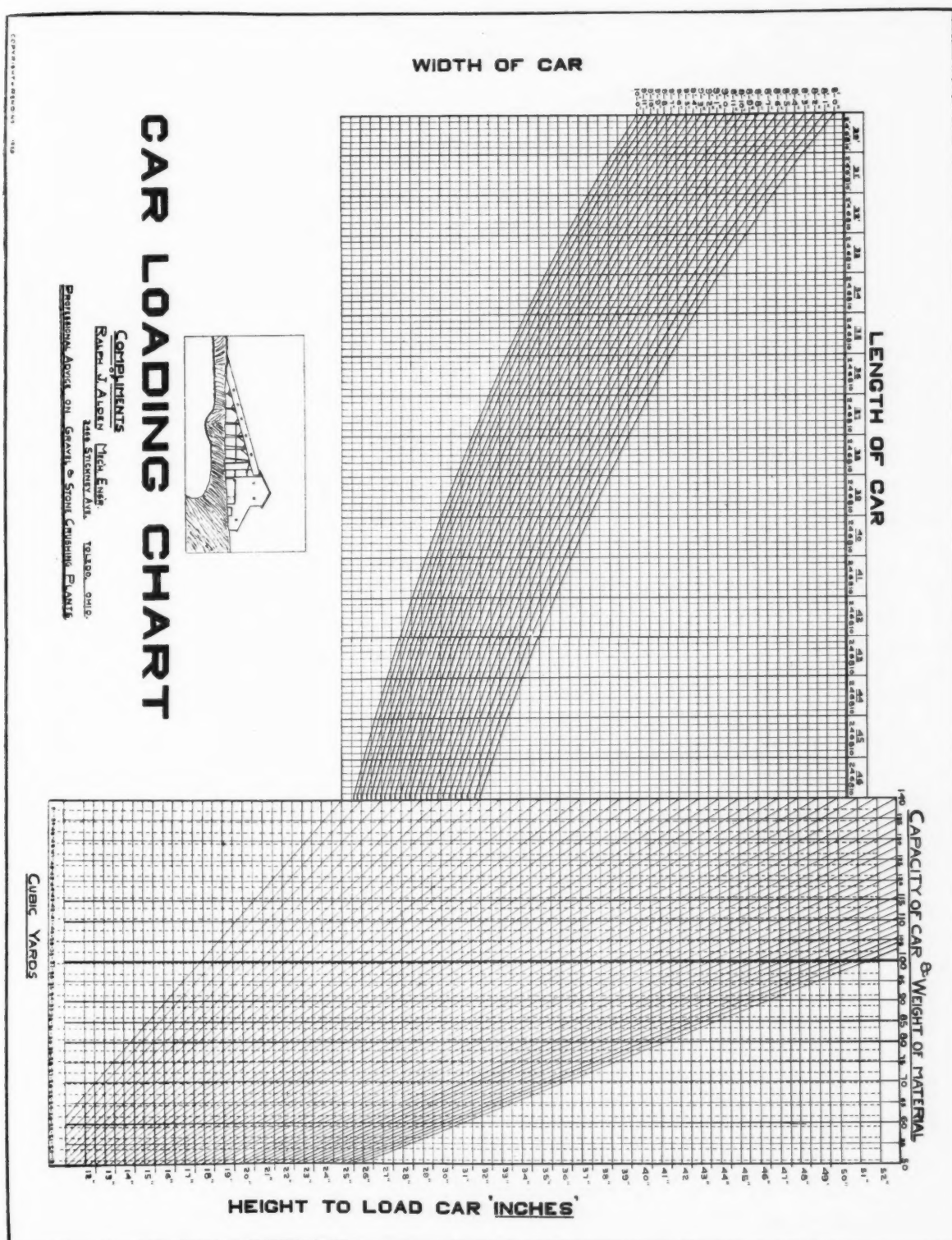


Chart for computing loading of flat-bottom open-top cars of crushed stone,
sand, gravel or slag

Instructions for use on opposite page

White Lime From Black Marble

Glens Falls, New York, Has Limestone About as Black as Coal—Burned in Vertical Kilns by the F. W. Waite Lime Company

THE GLENS FALLS, N. Y., district has a limestone different from that used for making lime in any other part of this country. It must have been a venturesome man who first made up his mind that such material would burn to white lime, for the stone itself is nearly black, is hard enough to take a polish and is known locally as black marble. It has at various times been quarried on a small scale for a decorative marble.

In spite of its color this limestone is preferred to others in the vicinity for lime burning. It is practically a pure calcium carbonate, whatever the coloring matter may be, it is evidently of an organic nature and is burned out in the kilns. No chemical analyses of the stone have ever isolated it.

The Glens Falls Portland Cement Co., whose property adjoins the Waite Lime Co., used this stone until recently when a deposit of natural cement rock on the opposite side of the Hudson River was opened up.

The Waite Lime Co. plant, which is illustrated herewith, consists of four coal-fired Keystone kilns. These are kilns where a water spray is used on the furnace fire in place of steam jets, as described in a recent issue of ROCK PRODUCTS.

Unusual Stone-Handling Equipment

The method of charging the kilns is quite unique. A Lidgerwood cableway of 400 tons per day capacity is erected on wooden towers so that it is centered over the kilns and extends beyond the incoming tracks from the quarry.

The quarry is about 1,000 ft. from the plant and the cars are brought to it by a small saddle tank steam locomotive. The cars are of special design, as shown in the accompanying views. Their bodies are made in the form of skips. The truck itself is a simple 4-wheel flat car of 3-ft. gauge.

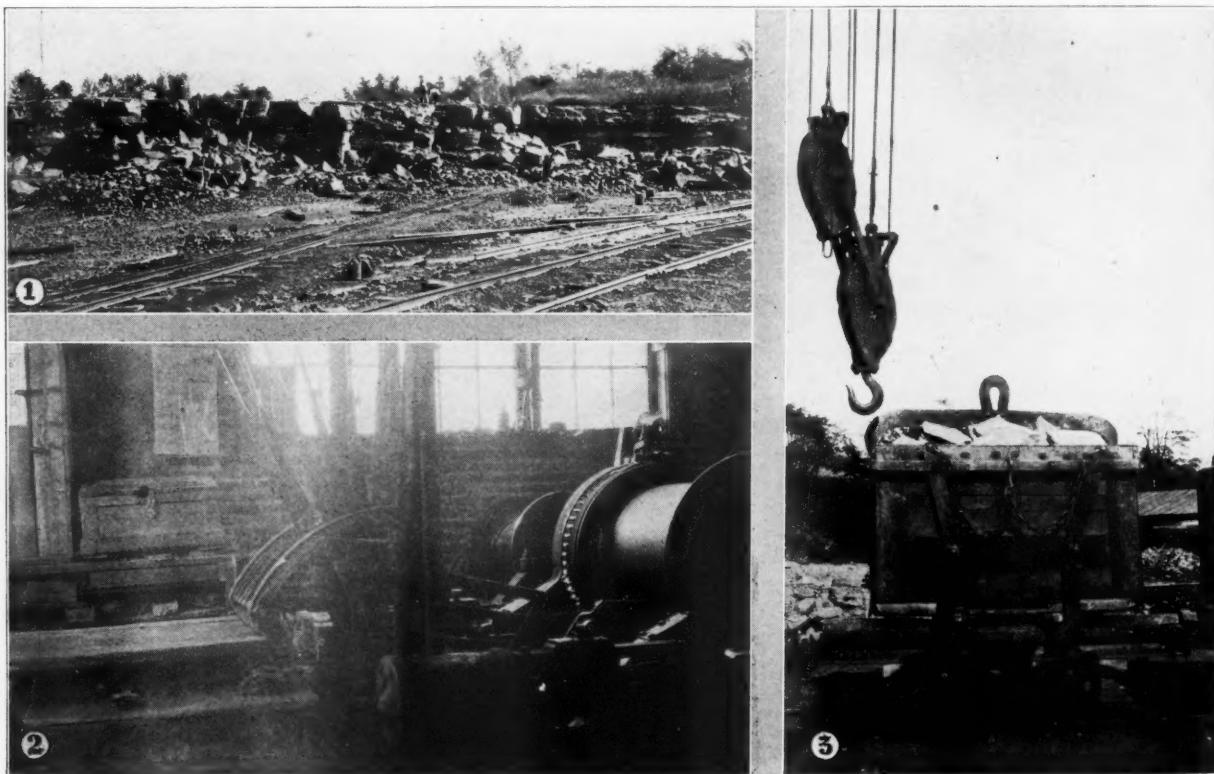
The cars are spotted under the cableway and the skips are lifted off, one at a

time and conveyed to a point over the kiln to be charged. The skips are bottom-dumping. The hoisting line is a 2-part line, the main part being attached to the eye at the top of the skip, while the other is attached to the chain which operates the dumping mechanism.

To dump the skips, the hoisting engineer takes up on the second line, drawing up the chain which is attached to the bottom-release clamps. Tightening this chain draws in the tops of the two levers shown in the view of the skip, and releases the hinged bottom.

The two clamps are kept from losing their hold on the bottom pins when the skip is in transit, by a coil spring. In placing the skip back on the flat car the bottom locks itself automatically like the bottom of a steam-shovel dipper.

Two men, the locomotive engineer to hook on and release the cableway block, and the hoist engineer thus do all the kiln charging. The hoist house is so situated, of course, that the hoist



1—Quarry view of the F. W. Waite Lime Co., Glens Falls, N. Y.; 2—Hoist house; 3—Type of quarry car and skip used to charge kilns

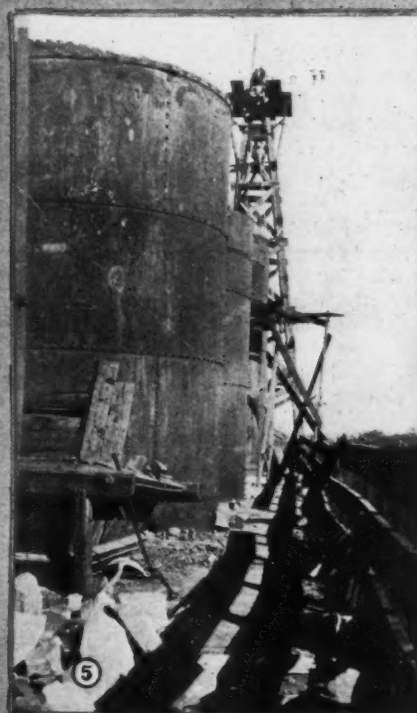
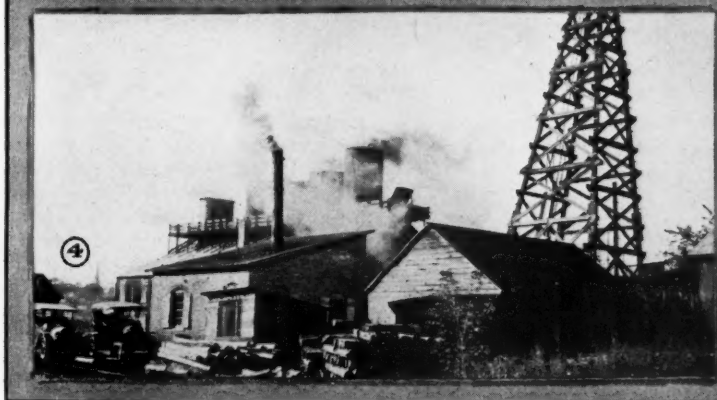
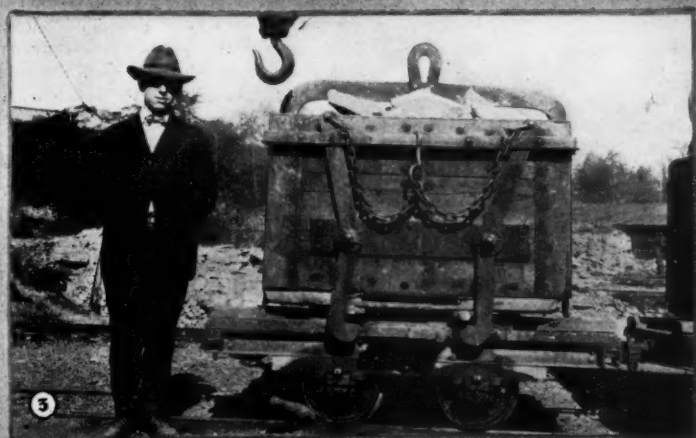
operator can see the train of loaded cars and the tops of the kilns he is charging.

The car and the cableway device for handling it are the invention of H. J.

Russell, president and general manager of the company.

The lime made at this plant is exceptionally good for certain purposes, one

being for wire drawing. It is also in demand for paper mills and tanning plants, because it runs up to 98 per cent calcium oxide.



1—F. W. Waite Lime Co. plant; 2—Cableway for charging kilns; 3—Type of skip car used; 4—Hoist house and cableway tower; 5—Near view of kilns

Practical Chemistry for Lime and Cement Manufacturers

VI—Hydrogen—Its Preparation—Industrial Uses—Compounds—Water

OWING TO THE FACT that hydrogen has a great affinity for oxygen, which is everywhere present, it is seldom found in the free state but usually exists in combination with oxygen or carbon, or with both. Combined with these elements it is quite abundant. Water is one-ninth hydrogen and most living organisms, including plants, are composed of hydrogen in combination with the two elements just mentioned.

Hydrogen is the lightest of the gases, being less than 1/14 as heavy as air. It is colorless, tasteless and odorless.

Hydrogen is one of the most interesting chemical elements. Attention has been called to its great affinity for oxygen. If a mixture of oxygen and hydrogen is confined in a closed vessel, no action takes place at ordinary temperatures but, if the mixture is touched off with an electric spark, the two gases combine with great violence attended with heat, light and noise. A jet of hydrogen will also burn in air with a pale almost invisible flame which gives off great heat. If a cold glass is inverted over the blue flame the steam which is produced condenses to droplets on the inner surface of the vessel.

Calcium Light

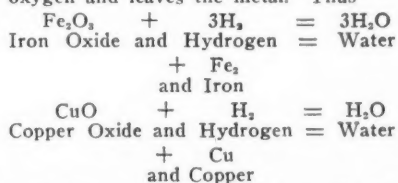
Although the hydrogen flame gives practically no light it is intensely hot and one pound of hydrogen will give off more heat when burned in air than one pound of any other element. A burning hydrogen jet will melt platinum and in a closed space a temperature of over 4500°F will be produced. This property of hydrogen is made use of in the oxy-hydrogen blow pipe. In the latter oxygen and hydrogen are mingled in a burner or torch in such a way that the oxygen so employed, and not the diluted oxygen of the air, burns the hydrogen. By this means, an intensely hot flame is obtained suitable for welding, melting platinum, etc. If this flame is allowed to play on a piece of lime, the latter becomes white hot at the spot when the flame touches the lime. This gives a brilliant light known as the calcium light, or lime light, at one time used for stereopticons, etc.,

Hydrogen will not unite directly with most metals but for a few of the non-metallic elements it has great affinity. It unites directly with another gaseous element chlorine, somewhat as with

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Baltimore, Md.

oxygen, to form hydrochloric acid. We are accustomed to consider combustion as something burning in air or oxygen. But we can burn oxygen in hydrogen and hydrogen in chlorine and vice versa. Fluorine, another gaseous element, also combines directly with hydrogen somewhat as does chlorine and the product is hydrofluoric acid. Hydrogen will not support life, nor in the ordinary sense of the word, combustion.

The affinity of hydrogen for oxygen is so strong that it will often displace other elements with which it is united. For example, if either copper oxide or iron oxide is heated in a laboratory tube and hydrogen is allowed to flow through the tube the hydrogen combines with the oxygen and leaves the metal. Thus



Hydrogen will not combine directly with carbon; that is you can not burn carbon in hydrogen, but the compounds of carbon and hydrogen are many and are known as "hydrocarbons," among which are marsh or gas or methane, CH_4 , benzene, C_6H_6 , etc.

Electrolysis of Water

The most common method of preparing hydrogen industrially is by the electrolysis of water. By electrolysis we mean chemical action produced by an electric current. Pure water itself is not a conductor, but a mixture of any acid and water is a good conductor. If we add a little acid to water and immerse the wires from a battery in the mixture, bubbles of hydrogen will begin to appear on the negative wire and rise to the surface. All the other constituents, whatever they happen to be are set free on the positive wire. In the case of a mixture of hydrochloric acid and water, chlorine will be set free at the positive wire, thus,

$\text{HCl} = \text{H}$ (negative wire) + Cl (positive wire). If sulphuric acid is used the reaction is more complex. Thus:

$\text{H}_2\text{SO}_4 = \text{H}_2$ (negative wire) + SO_4 (positive wire) but the SO_4 reacts with the water to form sulphuric acid and oxygen, thus

$\text{SO}_4 + \text{H}_2\text{O} = \text{H}_2\text{SO}_4 + \text{O}$ (positive wire). So that the net results at the two wires when sulphuric acid is used are hydrogen and oxygen.

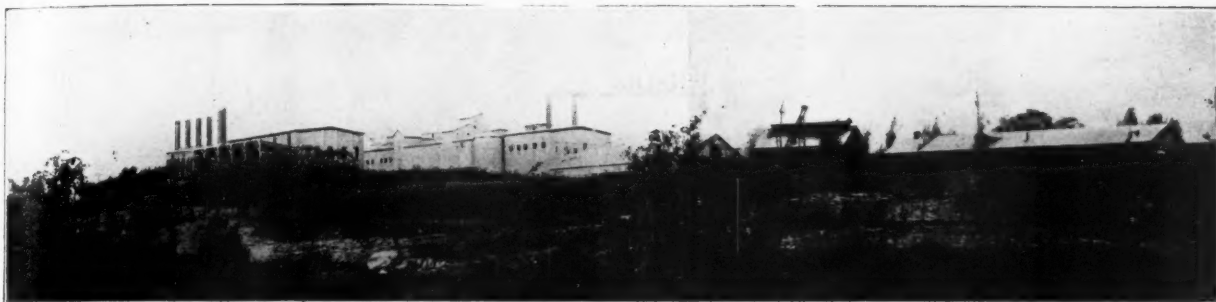
In the simple form of apparatus ordinarily employed in the laboratory for the electrolysis of water the wires connected with the source of current terminate in platinum plates which are contained in two tubes. The solution displaced by the gases is forced down and rises in the bulb behind the tubes. The head so obtained also furnished the pressure to force the gas out of the tubes when desired. The current of electricity flows from one wire to the other by means of the solution in the cross tube.

The platinum plates are known as "electrodes." The one attached to the negative wire is called the "cathode" and that attached to the positive wire is "anode." The mixture of acid and water is called the "electrolyte." The hydrogen rises from the cathode and the oxygen or other gas from the anode.

Formerly hydrogen was employed with oxygen in producing a high temperature flame in the oxy-hydrogen blow-pipe and for the lime light, but now acetylene, a cheaper and more efficient gas, has taken the place of hydrogen for welding, while the electric light has entirely displaced the lime light.

Hydrogen and oxygen unite in two proportions—two molecules of hydrogen with one molecule of oxygen and two molecules of hydrogen and two of oxygen. The former proportion forms water and the latter the familiar household chemical, hydrogen peroxide or hydrogen dioxide. Water has the formula H_2O and may be considered as hydrogen monoxide although it is never called anything else but "water" by even the chemist. Hydrogen dioxide has the formula H_2O_2 . The pure compound can not be kept and the ordinary hydrogen peroxide is a solution of the chemical in water, usually of 3% strength.

(To be continued.)



Plant of the Glens Falls Portland Cement Co., Glens Falls, N. Y., showing old abandoned quarry in the foreground

Control of Dry Mix at Plant of Glens Falls Portland Cement Co.

Natural Cement Rock, High Calcium Rock and Sandy-Clay Overburden Used Without Separation

ONE OF THE MOST INTERESTING and possibly one of the most difficult problems in the successful operation of a dry-process portland cement plant is the method used to insure a proper and constant mixture of raw materials. There is certainly a good deal of variety in the actual working out of the general method employed.

The aim of superintendents and chemists in all probability is simplicity of control and operation, and this is even more important in the quarry where the exercise of any control over operation is difficult because of the rough nature of the work, particularly where a steam shovel is used for loading.

For simplicity of quarry operation the chemist of the Glens Falls Portland Cement Co., Glens Falls, N. Y., has devised a scheme that would be hard to beat in a quarry where four quite distinct

raw materials are encountered. These four materials are a top soil of 3 or 4 ft., of sandy clay, a 60 to 130 ft. face of natural cement rock of varying composition from high calcium to low calcium and a face of about equal depth of pure high calcium limestone.

Quarry Operation

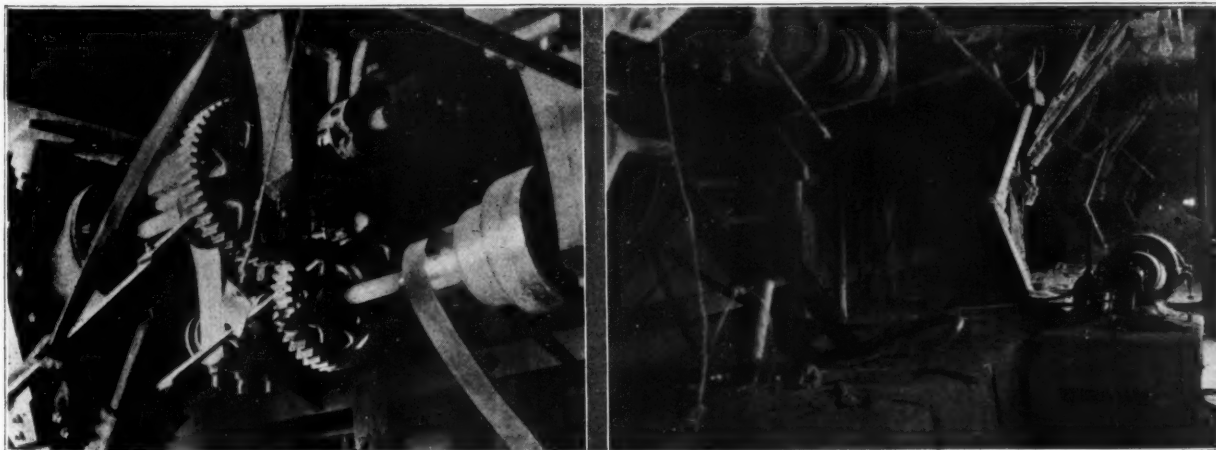
The quarry is on the opposite side of the Hudson River from the cement plant, and about a mile distant from it. The primary crushing plant is at the quarry and recently the two cylindrical concrete bins, shown in one of the views, have been added. These bins are roofed over and hold about 1,000 tons of stone. They provide for the stone supply of the plant in very wet weather, when the scheme of quarry operation described is rather difficult to maintain because of the gummy nature of the materials.

No stripping is done. Well drills are employed to blast-hole the entire face of the quarry down to the stratum of pure high calcium limestone. Besides the stratum of top soil, or stripping, there are two more or less distinct strata in this face, a high calcium cement rock and a low calcium cement rock.

The high calcium pure limestone is quarried from a separate bench or level in another part of the quarry as shown in one of the views. This part of the quarry does not need to be operated continuously, as the amount of pure limestone required to correct the mixture is not very large in proportion to all the stone quarried.

Crushing and Grinding

The crushed stone and overburden are brought to the raw grinding end of the cement plant in end-dump cars just as



Variable speed screw feeders at the bottoms of the six raw material bins; cone pulleys are driven from a line shaft at the right in the right hand view

the material is scooped up by the steam shovel and goes through the quarry crushing plant. At the cement plant the stone, which has already been through the No. 9 gyratory at the quarry crushing plant, is dumped into two No. 9 gyratories and reduced to about 1½-in. size and smaller.

The product of the two No. 6 crushers goes to two 6x60-ft. direct-heat rotary dryers. Difficulty is of course experienced with the operation of the No. 6 crushers when the material is very wet, and that is the reason for the stone storage bin at the quarry crushing plant, as already explained.

From the dryers the raw material goes through the ordinary process of raw material grinding (four 66-in. kominuters for coarse grinding and four tube mills for the fine grinding).

Raw Material Bins

The coarse ground raw materials from the kominuters is discharged by belt and screw conveyors into six hopper-bottom wooden bins or tanks which hold 120 tons each. A sample of the raw material going into the bins is taken every hour until a bin is filled, when a composite analysis of the whole 120 tons is available.

As soon as a filled tank shows by test that its lime content is too high or low, an amount of clay or limestone indicated by experience is ordered into the No. 6 crushers. This addition insures that the following bin will blend approximately with the one just filled and avoids the accumulation of too many high or low lime or clay bins.

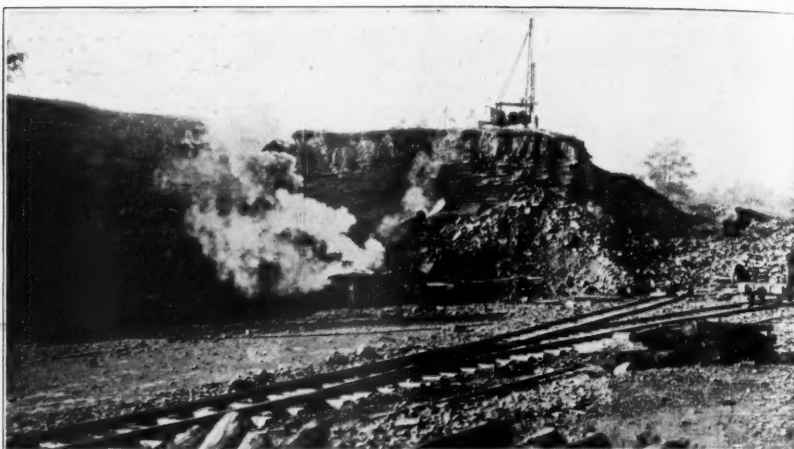
To see that some of these two grades of material (clay or limestone) are on hand is about the only attempt made to exercise control of the raw materials at the quarry end.

The raw material bins are arranged in a single row over a covered screw conveyor. Each bin has two screw discharges or feeders to the main screw conveyor. Each of the screw feeders has three different speeds, by means of belt-driven cone pulleys. By operating one or both these screw feeders it is possible to empty a tank or bin at six different rates from 250 to 1,500 lbs. per minute. These screws are of course calibrated to ensure their proper performance.

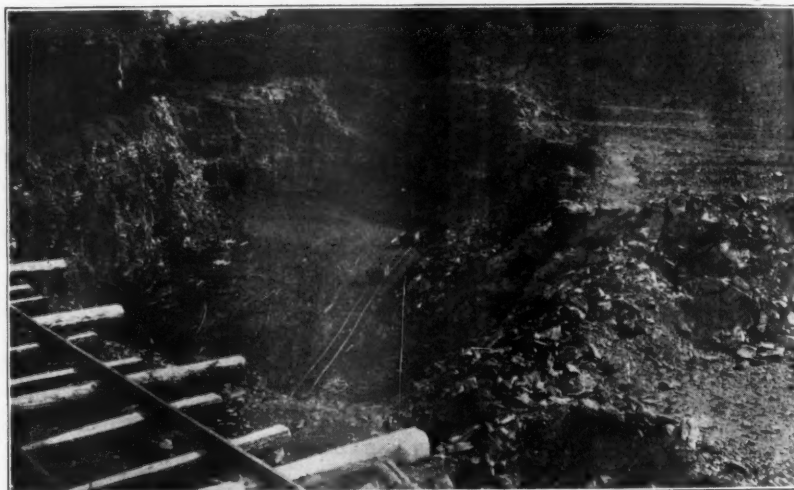
No weighing is necessary and owing to the elasticity of the feeding device from the bins the correct proportions can be accurately attained and very readily changed again if an error had been made in the analysis of either bin material.

Also owing to the elasticity of the bin feeding arrangement it is not necessary to use more than two bins to get the proper raw mix. The corrected mix is then conveyed to the tube mills for final grinding.

The original laboratory sample is taken



Working face of the quarry showing steam shovel excavating entire face, including overburden



Lower level where pure high calcium stone is obtained

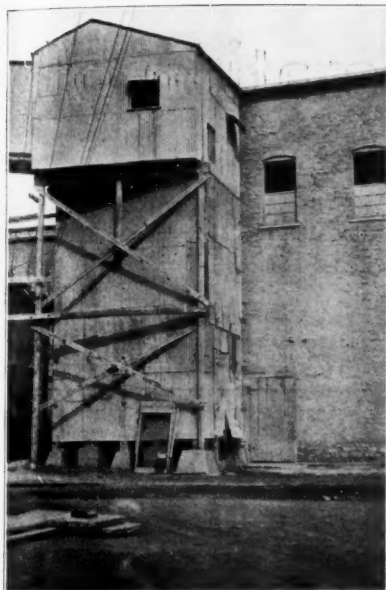


Quarry crushing plant showing track incline from quarry and at the right the track to the cement plant

from the material as it comes from the preliminary grinders and a check sample is taken when it comes from the fine grinders. A final sample is taken of the

raw mix after it is discharged from the screw conveyor under the kiln bins to a chute conveyor which feeds the kilns.

Such an installation as that described



Sample of mix as it goes to kilns taken from belt at upper window (in the center) and lowered in a pail to ground level as shown

is profitable because it permits the quarry foreman to bend all his energies to quantity production, unhampered by complicated and varying directions from the laboratory, and also because the bins properly operated provide a storage of 12 to 24 hours supply for the kilns in case of bad weather in the quarry, or breakdown at any point up to the kominuters.

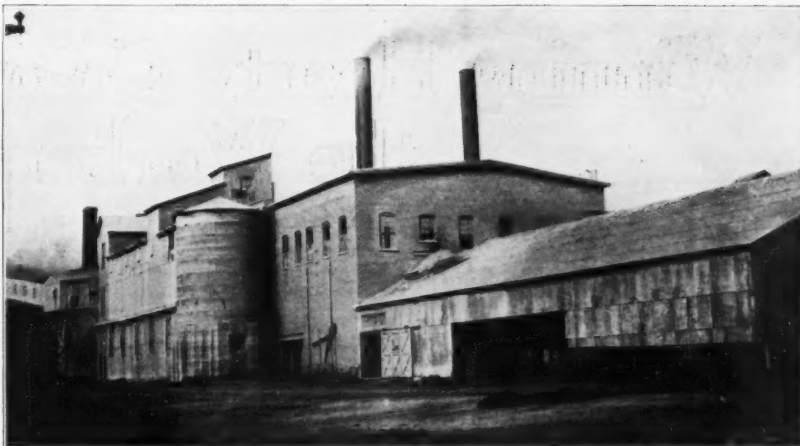
Clinker Burning

This plant has four kilns, the two largest being $7\frac{1}{2} \times 120$ ft. The pulverized coal burners are an original design, the coal dust being fed by a screw conveyor to the hood of the kiln, while the compressed air is piped separately to the hood and is mixed with the coal dust as it enters the kiln. Two rotary coolers, 6×60 ft. are used for the clinker. The clinker grinding equipment is identical with the raw grinding end of the plant, consisting of four kominuters and four tube mills.

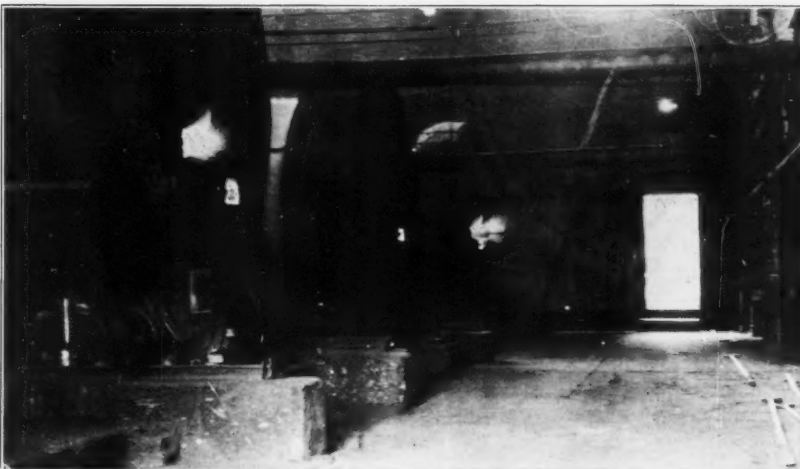
The superintendent of the Glens Falls Portland Cement Co. is W. A. Pollock and the chemist is J. B. Dixon. George F. Bayle is president and sales manager.

Further Increase in Cement Prices in Germany

ALTHOUGH the maximum price of cement, according to Commercial Attache Paul L. Edwards, The Hague, Netherlands, was increased by 12.20 marks per metric ton, on January 1, 1920, the German Government has found it advisable to grant still another increase. The price was raised by 51 marks per metric ton as from February 1 of this year.



Crushing and raw grinding end of the cement plant—Raw material tanks are in building behind the cylindrical concrete bin



Rows of kilns showing screw conveyors for pulverized coal feed and pipes for compressed air below



Close-up view of type of burner used showing separate inlets for pulverized coal and compressed air

Winning Hearty Co-operation of the Workers

"Industrial Democracy" Plan Proves Successful in New England Plant—"Economy Dividends" Produce Beneficial Results

IS IT NOT INTERESTING to know that, while it is difficult to maintain a contented family of two or three, there exists in North Adams, Mass., one happy family of some eight hundred persons? This group of modern industrial pioneers goes about work without contention, blazing a trail for future workers to follow, and mapping out a policy which will be felt years hence. The family is that of the Windsor Print Works.

Alfred Ferguson, the treasurer of the company, is enthusiastic over the splendid co-operative spirit of the workers and their readiness to meet any fair movement on a "fifty-fifty basis." He believes, too, that the same plan which has been so successfully worked out in the Windsor Print Works can be applied in almost any plant, provided it is backed by a mutual desire for justice, success and happiness.

The Windsor Works has been operated on the industrial democracy plan for almost a year. Workers are engaged in the printing of cotton fabrics, and bleachers, printers, finishers, dyers, clerical workers, etc., form one vast happy family. The employees of the company are for the most part Americans, some of them of old Anglo-Saxon stock, but there are a number of foreign workers from many different countries. Yet everywhere in the plant English is spoken to the exclusion of foreign languages.

How this group of workers took hold of the industrial democracy plan and placed it in successful operation is a colorful story of progress and industry, of old systems swept away by the new.

"We had always been willing to try any plan which would make for better conditions all around, without having any definite idea in view," said Mr. Ferguson recently. "When much was published concerning industrial unrest and methods for meeting the after-war conditions, however, we commenced to think seriously of ways and means to meet the situation. John Leitch's industrial democracy plan impressed us deeply, and we decided to give it a fair trial; and we have followed his plan since reaching that decision."

Plan Installed By Employees

Cautioning against insincerity of mo-

By E. C. Curtis and
B. C. Forbes

tive on the part of employers in establishing new methods, Mr. Ferguson said: "Employees will very soon detect any attempt to fool them, and a scheme undertaken with such a purpose will cause only distrust and the confirmation of suspicions. If, however, employers go into the thing with a real desire for justice, they will soon break down the barriers of distrust."

Mr. Ferguson said that no effort had been made at the Windsor Print Works to rush matters, or to push the plan ahead with more haste than the employees might wish. On the other hand, the work of establishing the new system and putting it into effect was accomplished by the employees themselves.

"We have gone step by step, always carefully feeling our way, and what we have done has been done only after due deliberation and experiment," Mr. Ferguson continued. "The various steps have been fairly and thoroughly tested by our needs and experiences."

"We have found that the plan has brought us much closer together than would be possible under other conditions, and that we have been able to eradicate many mistakes and much of the waste that occurred under the old system."

"There has been a greater measure of contentment among the employees. They now feel that they are a part of the works and that they will get a square deal. They know it is impossible for them to lose out without sufficient cause, for a grievance of a personal nature cannot cause a man's dismissal under the new system. His co-operative spirit is the dominant factor in deciding his place, and he has at all times a recourse to justice at the hands of fellow workers, in the person of his foreman and his representatives. So interested have the workers become in the plan that they have held several joint meetings of the employees' 'house of representatives' and 'senate' to discuss methods and devices for improving quality of production and bettering working methods and conditions."

"An invention and an improvement in

method were recently devised to make for a greater saving of work and a better quality product," said Mr. Ferguson. "Without the co-operation of the employees, the invention and improvement could not have been successfully adopted. The employees gave their co-operation, and I never before witnessed so general an interest among workers over a similar accomplishment. In the old days, this interest would not have been possible. Then there would have been a little suspicion, mingled with only lukewarm interest."

Coal Bill Cut 25 Per Cent

Many factory owners, who were victims of the coal shortage last winter and in 1918 and the resulting tie-up of production will be interested in the Windsor Print Works' coal saving, for the coal bill has been reduced 25 per cent since the adoption of the new plan.

"The furnaces had been improved the year preceding the adoption of the new plan, and new devices installed," said Mr. Ferguson. "During the past year, under our industrial democracy plan, the same apparatus has been in use. Despite the fact that these modern devices made it difficult to effect further economies in the consumption of coal, a large amount of coal was saved through the work of the firemen and all who had to do with fuel in their even and thoughtful feeding of the furnaces, and their general care of the coal and furnaces."

"That has not been our greatest saving, however. One of our worst extravagances had been waste of materials. This waste was in misprints, odds, ends, soiled parts and general imperfections. The best part of the waste was classed as 'seconds,' but a large part went as rags, which resulted in a great loss to the company. The matter was put before the employees, and they immediately commenced to stop the leak."

And what does all this thrift and care mean to the employee? What is his reward for this diligence and industry in saving the company's materials? This co-operation on the part of the employee means a material gain to him, in addition to increasing his value as a member of the community. It means added dividends, for "economy dividends," based on savings in the plant resulting from

the combined efforts of the workers, are distributed. It is a "fifty-fifty" plan, half of the savings going to the company and half to the workers. Even in the short time the company has been operating on this basis, dividends paid to the workers have been as high as ten per cent. And they will go higher, Mr. Ferguson believes.

Co-operative Insurance Plan

"At present, we have a co-operative insurance plan, whereby employees pay one-half the cost of the policy and the company the other half. The workers have displayed a spirit of progress along such lines and have brought about most of the measures of this sort which have been adopted. They have shown themselves will be able to see their own needs and to plan to care for them.

"Our co-operative store was estab-

lished by the workers, with the help of the company, which purchased the initial stock and donated the space for it. The rest of the work in establishing and carrying on the store has been done by the employees, who pay the wages of the clerk in charge. At the co-operative store, the employees can purchase groceries and other supplies for cost plus their share in paying the clerk's salary."

Mr. Ferguson is authority for the statement that the employees have not once during the last year displayed the slightest unfairness. When requests for wage increases are made, the investigating committee, composed of employees, studies the matter and reports as to the justice of the demand. In all such cases, the decisions have been impartial, and the departments involved and the company have abided by the reports. The com-

pany has maintained a standard of wages equal to that in any similar plant, and the "economy dividends" in no way affect the wage scale, according to Mr. Ferguson.

"I believe that we have found the solution to the difficulties between employers and employees," declared Mr. Ferguson. "Doubtless, the system and its applications will develop and improve. At the end of the first year under the new system, we will be able to gauge accurately the financial benefits to the company and the employees. So far, it has worked to our mutual advantage, and I do not hesitate to say that wherever it is tried with a purpose for right and justice on the part of the employers, it will meet with fair treatment and success at the hands of the workers."—(Copyright, B. C. Forbes Pub. Co.

Use of Talc and Soapstone in the Ceramic Industry

Foreign Developments in This Field Point to Prospects of American Producers

By Raymond B. Ladoo
Mineral Technologist, Bureau of Mines

ONE OF THE COMPARATIVELY little known uses for talc is its use in the manufacture of pottery and porcelain. The properties and uses of talc have been studied more extensively in Austria and Germany than in this country and a pottery body containing talc has long been in use there. A large quantity of ware has been manufactured, known as "steatit," composed of talc or steatite and clay.

In this country the use of talc in the ceramic industry has been studied to some extent and a paper entitled "Talc as a Body Material" was prepared in 1913 by C. W. Parmelee and C. H. Baldwin.* They used a talc purchased from a dealer in potters' supplies and mixed it with five different bodies in proportions varying from 1 to 30 per cent. The results of their work they summarized in the following words:

Talc as a body material may be introduced in considerable quantities at the expense of the clay content without affecting the working properties of the body.

It has a decided influence towards promoting the translucency of the ware even when introduced in small quantities. The light transmitted through such translucent ware is of a whiter quality.

The color of the ware is made whiter by the addition of the talc, and becomes of a grayish tone in some mixtures.

Talc promotes vitrification in the body: This vitrification proceeds slowly and apparently without the sudden fusion peculiar to lime.

Progressive additions of talc to a body, up to certain limits, increases the toughness as measured by abrasion loss. This increase is noticeable with all the feldspar contents examined. This is quite in accord with the statement by Richard (Proc. Cong. Appl. Chemistry, 1909. Abstracts Eng. Cer. Society, Vol. 8, page 13) that the usual lime earthenware is comparatively easily breakable. The introduction of magnesia as well as lime into the clay body gives more resistive power toward knocks or pressure.

Experiments have also been made with talc, using it as a constituent of glazes for porcelain. S. Kanashima,† as a result of his work on a talc from Manchuria, China, reached the following conclusions:

1. Talc glaze is more fusible than lime.
2. Talc glaze is not as liable to over-fuse as lime glaze.
3. Talc glaze is generally more lustrous than lime glaze.
4. Development of color in under-glaze is less brilliant with talc.

If these results can be substantiated by using domestic talcs, a new field of use should be developed.

The value of talc in the form of "lava" for both heat and electrical insulation has long been known, but synthetic or

artificial lava, made from ground talc, has not been commonly used in place of electrical porcelain. Experience has shown that porcelain at temperatures above 300° C. is worthless for electrical insulation, and at 600° to 700° C. acts as a conductor rather than an insulator. In addition porcelain will not stand rapid changes in temperature, through large limits. But lava, or a mixture of talc and clay, may be heated to redness and plunged in cold water without injury. When talc is baked to form lava, the lava has practically no expansion or contraction and standard threads cut in the original talc are still standard after baking into lava. The dielectric strength, or insulating value of lava is as great as, or greater than that of porcelain, even at high temperatures. In fact Barringer states, in a discussion of the paper by Parmelee and Baldwin previously referred to, that a body containing "talc is enormously more heat resistant than porcelain and enormously better as an electrical insulator."

Three factors governing the use of any material are adaptability, superiority over material now in use, and price. The first two factors, as regards talc, have already been proved in its favor, at least in part. The question of price may be easily settled by comparing the price of talc with that of other ceramic materials. According to recent quotations English china clay, powdered, sells for \$30 to \$60 a ton, domestic china clay, powdered, \$25 to \$40 per ton, feldspar \$13.50 to \$18 per ton, all prices f. o. b. New York; but talc, powdered, may be obtained at \$12 to \$17 per ton. Talc of the very best grade, suitable for toilet use, sells for prices up to \$60 to \$70 per ton, but material of this grade need not be used in the ceramic industries. As talc would be used as a partial substitute for both china clay and feldspar, evidently there can be no argument against talc upon the basis of price.

*Trans. American Ceramic Society, Vol. 15, 1913, pp. 532-546.

†S. Kanashima, Jour. Chem. Ind. Tokyo, Vol. 20, pp. 850-860, 1917.

The Freight-Rate Hearing on Mineral Aggregates

National Association Officers and Delegates Gather in Washington in Biggest Fight for Recognition of the Industries Ever Staged

"TO BE OR NOT TO BE, that is the question." As this issue of ROCK PRODUCTS goes to press many weary delegates are returning to their homes from Washington, D. C., after placing before the Interstate Commerce Commission their claims for justice for the mineral aggregate industry. It is perhaps the most important public recognition that sand, gravel and crushed-stone industries have ever received and it is hoped that every possible advantage will be taken of it to gain the public ear, as well as the ear of the Interstate Commerce Commission.

Seriousness of Situation Appreciated

It is mightily well for the mineral aggregate industries that they had national organizations and officers of those organizations who did not hesitate to assume personally the expense of time, patience and money to make this fight for the cause. That responsibility should certainly not be personal and all who have not contributed to the cause should do so even now, because there must undoubtedly be a deficit to be made up out of the pockets of those whose faithfulness, watchfulness and energy have saved both the time and money of those who stayed at home.

The postponing of the hearings of the shippers for over two weeks was a godsend in permitting the gathering and compiling of just so much more traffic data, but it also involved a heavy expense, for the officials of the National Association were compelled to make another trip to Washington, which was not anticipated.

V. O. Johnston, president and E. Guy Sutton, business manager, of the National Association of Sand and Gravel Producers have been particularly active in behalf of the industry. Fortunately their efforts have been widely appreciated and the industry went upon the witness stand with the whole-hearted co-operation of sand and gravel producers throughout the country.

No stone was left unturned by the gravel men to have their case properly presented. O. P. Gothlin, an attorney of Dayton, Ohio, was employed to lay the facts, statistics and argument before the Interstate Commerce Commission. Mr. Gothlin has specialized in hearings before the Interstate Commerce Commission, as well as state public service commissions; he was Railroad Commissioner of Ohio for seven years, and was connected with the Indiana Public Service Commission for three years. Mr. Gothlin was so deeply im-

pressed with the injustice of General Order 28 as it affected sand and gravel rates that he made a close study of the subject. He was unusually well equipped to defend the rights of sand and gravel producers in the case before the Interstate Commerce Commission.

In presenting the producers' protest, denial was not made that the railroads need additional revenue, but it was established that the sand and gravel industry is now bearing more than its share of trans-

National Associations Will Fight for Just Car Supply

Realize the Transportation Difficulties and Offer Constructive Co-operation

IN SPITE OF A RIGHTEOUS INDIGNATION that their industry is being unnecessarily hampered by a lack of understanding of its position, sand and gravel and crushed stone producers show every indication of a fair appreciation of the transportation situation as a whole, and a desire for justice only. This is evident in all the work of E. Guy Sutton, business manager of the National Association of Sand and Gravel Producers, at Washington, and has won for him and the industry the well deserved appreciation of the car service section of the Interstate Commerce Commission.

The same spirit of appreciation of the difficult problem the Interstate Commerce Commission has undertaken to solve is shown in the following letters prepared by John Rice, president of the National Crushed Stone Association, with the approval of the executive committee, and sent to the Commission from Chicago on June 8:

TO INTERSTATE COMMERCE COMMISSION:

We enclose copy of letter to members of National Crushed Stone Association, suggesting patience in their extreme embarrassments by reason of present car shortage.

At the same time we trust you will take into consideration the enormous sacrifices the stone industry was compelled to make during the war and as soon as there is opportunity to grant relief you will give our situation your special sympathetic consideration.

Even at the present time the necessity for road building should and doubtless will not be overlooked and especially

portation charges and should not be further burdened until rates on other commodities are equalized.

Stone Men Use Similar Argument

A meeting of the executive committee of the National Crushed Stone Association was held in Chicago, June 8, at which action was taken on both the car shortage problem and the freight rate case. In general the same arguments were used in presenting the crushed stone case, as in the sand and gravel case.

As this issue of ROCK PRODUCTS goes to press there is evidence of a feeling of much more hearty co-operation and understanding between these two allied industries. A joint meeting was held in Washington, on June 16, and it is hoped that unity of interests in national affairs will be more keenly appreciated in the future.

should every effort be made by railroads to supply cars to their maximum ability where stone loading is in direction of empty car movement to coal mines; not only in our selfish interest, but in interest of national economy, public welfare, and railroad revenue as well.

With the executive committee's approval President Rice also addressed the following letter to the crushed stone industry:

TO MEMBERS OF THE CRUSHED STONE INDUSTRY:

In view of many earnest appeals from members all over the country to the Association for assistance in securing improvement in car supply, it was deemed advisable to call a special meeting of the executive committee.

This meeting was held in Chicago, June 8, and all data and information bearing on this unfortunate situation was given earnest consideration. The evidence seems to indicate however that conditions are most extraordinary and that every effort is being made by railroad companies, supported by Interstate Commerce Commission, to do their utmost under the circumstances and any organized pressure upon the Interstate Commerce Commission only adds to its embarrassment as well as that of the railroads. It is believed by the executive committee that at the present time best results for all concerned will be obtained by individual shippers presenting their cases to their respective railroads for the best adjustments possible.

It is sincerely regretted that your committee can offer you no specific relief at the present time, but it will endeavor to keep in touch with the situation and urge the Interstate Commerce Commission to grant relief at the earliest moment possible.

Cement Brick as a Side Line for Aggregate Producers

Something with a Real Future—Over 80 Per Cent of the Brick Used Today in Portland, Oregon, Are Made of Cement and Sand

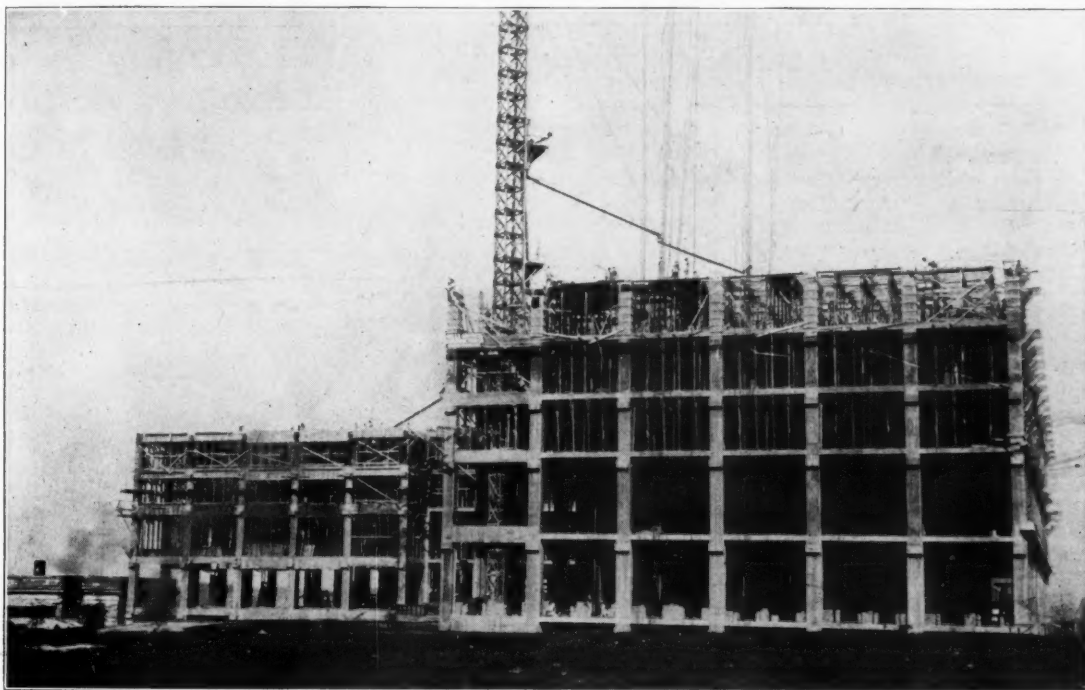
A GREAT MANY sand and gravel, crushed stone and slag producers like to speculate on what they can do to enhance the value of their products—in what ways the manufacturing process can be continued to utilize the greatest benefit from their raw materials, which are so plentiful, and add to the profit of producing them.

There are a host of things that can be made of concrete—hollow blocks, drain tile, pipe, roofing tile and the like—but nearly all these are more or less specialties and have a restricted market, or a market that would be hard to break into. On the other hand brick is a universal building material, finds a ready market wherever buildings are erected; and their

manufacture, once understood, is absurdly simple.

From a Personal Inspection

It was the editor's good fortune recently to pay a visit to D. F. Shope, president and general manager of the Shope Brick Co., Portland, Ore. Seeing is believing. Otherwise it would have been very difficult to convince the editor



New Portland, Oregon, warehouse of the Montgomery Ward Co., built of red-faced cement brick



C. H. Bliss of the Shope Brick Co., Portland, Oregon



Laying cement brick in walls of Montgomery Ward building

that what he saw done at Mr. Shope's plant was possible to do with concrete.

When one enters Mr. Shope's salesroom it is difficult to believe that his is not in the show room of a first-class tapestry clay-brick manufacturer, because the exhibits of panels, fire places and mantles so closely resemble high-priced tapestry brick of various hues and tints and *texture* that one is reluctant to believe that these results can be attained with concrete.

Mr. Shope, by the way, is every inch the artist, laboratory worker and investigator and not at all the promoter type. His record shows that. He began, as a concrete construction contractor, by inventing a process for coloring concrete surfaces with mineral pigments. This process in its essentials consists of applying a mixture of neat cement and coloring material to the concrete and so rubbing it into the surface that it becomes an integral part of the concrete and forms a practically waterproof surface—which is one of the big advantages of the concrete brick over the clay brick. This process is patented.

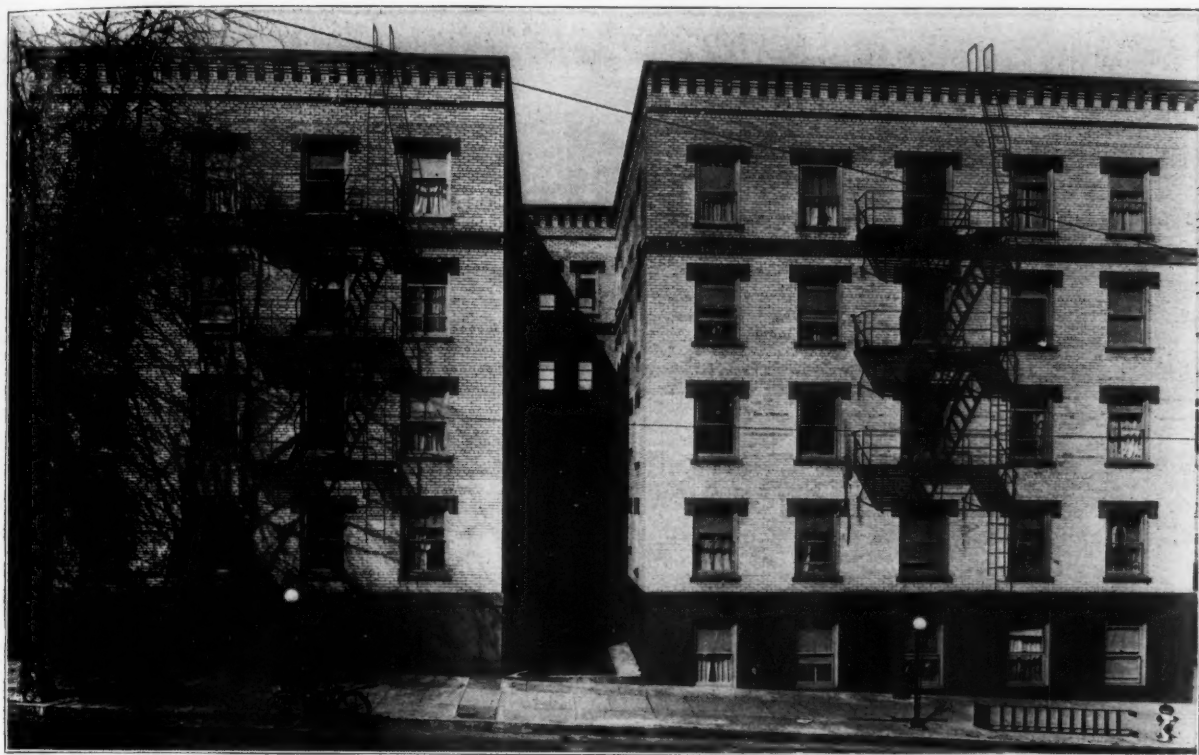
Mr. Shope first began the manufacture of cement brick in a small way, but from the first he specialized in quality and artistic appearance, and for some time his business was confined to interior and decorative work. This is mentioned merely to emphasize that for appearance and



Fireplace of tapestry cement brick



Bungalow of tapestry cement brick, Portland, Oregon



Apartment building at Portland, Oregon, with ordinary cement face brick, buff colored



High class residence at Portland, Oregon, showing decorative effects with cement brick

artistic effects, his bricks could not be beaten. He has never competed with clay brick on a *cheapness* basis, but always on a quality basis.

In the course of time he associated with him C. H. Bliss, who supplied the business getting talent necessary, and as a result the Shope Brick Co. is today furnishing probably not less than 85 per cent of all the brick used in the city of Portland, Ore.

Examples of Concrete-Brick Structures

The views shown on the first page of this article are of the new West Coast Warehouse of Montgomery Ward & Co., the great mail order house of Chicago. This is the largest structure being built in Portland and its walls are red-surfaced concrete brick throughout. The other views show a few of the many buildings in Portland where Shope brick have been used with entire satisfaction.

These brick are in all the shades any clay brick manufacturer can produce—and then some. Moreover these brick are uniform in color which is never possible in the case of clay brick that are burned in different kilns or in the same kiln under different conditions of temperature.

These brick were all made by ordinary workmen in hand-operated tamping machines; the only power in the plant is that of small motor required to operate the concrete mixer and some elevators.

Long experience in making the brick has taught this manufacturer exactly the right amount of water to use with the given materials. Much trouble was at first experienced because of the masons' objections to laying these brick, which, like most concrete brick, were too slick and not absorbent enough to lay up like a clay brick. This difficulty has been overcome in the amount of water used and in the amount of tamping, so that the bricks now made have as good a surface for the mortar as any clay brick and have a practically *waterproof* face which a clay brick does not have. They will test as strong or stronger than the average clay brick.

With white cement and white sand Mr. Shope produces a white-surfaced brick which competes with enameled clay brick at \$60 per 1,000. He has devised and patented a method for producing a cast surface as smooth as a polished surface.

There are, as can be seen, unlimited opportunities to develop decorative specialties, and it is in this work that Mr. Shope most delights. He is too busy doing this sort of thing to do much in the way of promoting his process.

By Your Leave

While the foregoing may read a good deal like a prospectus for Mr. Shope and his process of making cement brick, it is not at all so intended. The editor has seen a great man, "concrete products"

and has had many inquiries from mineral aggregate producers as to the advisability of going into a concrete-product side line.

The difficulty is, as already noted, that many of these things are specialties and of limited marketability. Moreover their manufacture is a specialty. In this case, however, the process appeared so simple and the product so meritorious and of such universal utility, that the editor was enthusiastically impressed; and he believes that in putting this information before his readers in the sand, gravel, crushed stone and slag industries, he is doing them a more extensive good turn than he is Mr. Shope.

John S. Porter Killed by Motor Truck

THE NATIONAL SAND AND GRAVEL ASSOCIATION has lost a dearly beloved member and an earnest and steadfast worker and booster in the death of John S. Porter, president of the Federal Sand and Gravel Co., Saginaw Mich., on May 25, following injuries received when run down by a motor truck on the previous day.

Mr. Porter was held in high regard by a large circle of friends in the sand and gravel industry. He was one of the first and most enthusiastic supporters of the National Association of Sand and Gravel Producers, and a member of its executive committee. He was one of the founders of the Michigan Sand and Gravel Producers Association and its secretary during the first years of its organization.

He was a most enthusiastic worker for the cause and the industry is indebted to him in no small degree for the progress made by the National Association. Mr. Porter was ever ready to answer the call for assistance and counsel when the



John S. Porter,
President, Federal Sand and Gravel Co.,
Saginaw, Mich.

plight of the industry required them.

Mr. Porter was a prominent man in his home community. He was a former city assessor and served on the Saginaw Board of Commerce as a director until recently. He was about 65 years old and is survived by a widow.

H. D. Conkey's New Gravel Plant at Oregon, Ill.

A new type of gravel washing plant is now under construction at Oregon, Ill., according to local reports. With features long the desire of producers, this plant not only has the capacity but will handle economically its output, and combines low cost with quality of product it is claimed. H. D. Conkey & Co., Mendota, Ill., owners of the new plant, now operate a plant in the same location. The years of service however now make it necessary to replace the old structure, and as it continues its operation the new plant is rapidly growing beside it.

Oregon has always produced a product of good quality. A 12-in. centrifugal pump driven by a 200-hp. motor dredges the material from Rock River at a depth of 40 ft. and forces it through 400 ft. of 12-in. pipe to the top of the plant, 38 ft. above the level of the river, where it is separated and the oversize crushed.

In the new plant the excavation will remain the same. However the problem of the company has always been the production of several sizes without increasing the power consumption.

Several engineers failed to find a satisfactory solution for this problem. C. G. Knoblauch, engineer for the company, and C. M. Lowery, superintendent of the plant ever since its early days, made an intensive study of the matter, with the result that will soon be evidenced upon completion of the work.

The company with the new plant will be able to supply two sizes of gravel and two of sand with any size of special screen running. Unlike most plants this one will load from two sides, making possible any proportion of mix. The capacity which now is about 500 yards a day will be very close to 900 yards per day with the new equipment. The track and loading facilities will be correspondingly increased.

With the exception of the concrete base the construction is being done by the company. All material is on the ground and it is expected that the new plant will be in operation very soon.

Lime in Animal Food

THE USE OF LIMING MATERIALS in animal foods is receiving attention at the Ohio Station. Very marked benefits from the introduction of suitable forms of lime in the rations have been observed.

Random Comments on the Issues of the Day

Possibly no "concrete product" of the present time holds a bigger future than the concrete brick. For a long time many cement men were optimistic enough to believe that monolithic concrete construction would back the brick industry off the map, and together with the extortionate demands of union bricklayers, it must be confessed cement has put a big crimp in the clay-brick industry.

Concrete Brick

Nevertheless, there are so many advantages to building with brick and its use has been entrenched for so many thousands of years, that brick refused to be crowded out and probably never will be crowded out. So now, with the advent of the successful concrete brick, and the economy which is sure to come in large scale quantity production, it certainly looks as though the cement manufacturers and the mineral aggregate producers were destined to profit at the expense of the clay-brick industry.

It is to be hoped that the Interstate Commerce Commission will make its decision soon and relieve the tension in the minds of producers of mineral aggregates. In these days of car shortages, labor turnovers, etc., etc., any unnecessary worries should be avoided so far as possible.

Freight-Rate Problem

The case of the mineral aggregate producers has been so well put before the Commission that it would seem justice demands a suspension of any increase in rates on these commodities, at least until the situation can be investigated to its own and the railways' own satisfaction.

There is a strong feeling among some producers that the question of increasing the rates on mineral aggregates should be referred back to the individual railways, for the exercise of their own traffic officials' judgment as to what increase the commodities can stand, if any.

The argument is that the business has been built up by the railways themselves, in many instances, to give them opportunity to utilize equipment and train crews which would otherwise have been employed in non-productive hauls. These mineral aggregate producers feel that under such circumstances the railways ought to be their best friends in the present crisis, and they are willing to rely on the business sagacity of these railway traffic men to get a fair deal.

Whether such an argument will hold water before the Interstate Commerce Commission at the present time remains to be seen. But in the last analysis it must be conceded that the freight rates of the future on these commodities must get back to some such

basis, if the situation ever comes again when the railways are seeking business instead of trying to avoid it, as at the present time. In other words, there was a good reason for the old way of doing things, in spite of the inequalities and injustices it may have caused in some instances.

An interesting sidelight on the grief experienced by municipalities, which proceed on the basis that there is nothing to sand and gravel production, is given in the case of the city of Red Wing, Minn. When these public officials balked at paying a legitimate producer a profit of 5 or 10 cents a ton they did not figure they would be getting 25 to 50 cents' worth of service.

Municipal Gravel Pits

Consequently we have a case of the county commissioner, C. H. Tiedeman, begging: "Speed up. We are losing \$125 a day now. The city, too, is losing its profit on the gravel contracted for by the county." "We are not making a profit," replied Mr. Lundquist, president of the city Board of Public Works. "Well, that isn't what you told me a few months ago. Unless we get gravel within a few days the contractors will lose their construction crews. It seems to me that delay is unnecessary. You have blue prints and specifications to guide you in installing machinery and equipping the pit properly and much of the work could have been done before the machinery arrived," said Mr. Tiedeman, according to a local newspaper.

A few experiences like this will teach the city fathers of Red Wing and Podunk and other places that maybe it requires a little gray matter to erect a sand and gravel plant, even though it be a dinky one, and still more gray matter to operate one.

According to press dispatches from Berlin, Germany, Friedrich Riegel, a German engineer, has made important experiments on the utilization of carbonic acid gas from blast furnaces for the fertilization of edible plants, and the experiments have proved a great success.

Carbonic Acid Fertilizer

If there proves to be anything to this it will be matter of great interest to lime manufacturers who produce about a ton of carbonic acid (CO₂) for every ton of burnt lime made.

Progressive lime manufacturers have always looked forward to making some use of this valuable byproduct, which now escapes into the air, and if some cheap method of recovery and fixation of the gas is developed and the product made use of in agriculture, the future of the lime industry would be rosy indeed.

Twelve Principles of Industrial Relations for Consideration

How the Committee of the Chamber of Commerce of the United States Would Solve the Labor Issue

TWELVE PRINCIPLES OF INDUSTRIAL RELATIONS, prepared by a special committee, were sent out to a vote June 9 of the more than 1,300 industrial and commercial organizations comprising the membership of the Chamber of Commerce of the United States.

The principles are intended to include the fundamentals of employment relations. The committee that drew them up is composed of members of the Chamber's board of directors. It was appointed after the close of the President's First Industrial Conference to consider the principles presented by the employers' group in the conference.

The committee's report, containing the proposals submitted for a vote is given as follows:

Employers' relations in American industry should accord with and express those ideals of justice, equality and individual liberty which constitute the fundamentals of our national institutions. The terms of employment should conform to the essential requirements of economic law and sound business practice. They should, through intelligent cooperation, based on a recognition of mutuality of interest conduce to high productive efficiency. They should reflect in ever-increasing degree an effort to realize broad ideals of individual and social betterment. In government and public service employment the orderly administration of government must be assured, and the paramount interest of the public protected.

I.

Any person possesses the right to engage in any lawful business or occupation, and to enter, individually or collectively into any lawful contract, either as employer or employee. These rights are subject to limitation only through a valid exercise of public authority.

II.

The right of open-shop operation, that is, the right of employer and employee to enter into and determine the conditions of employment relations with each other, is an essential part of the individual right of contract possessed by each of the parties.

III.

All men possess the equal right to associate voluntarily for the accomplishment of lawful purposes by lawful means. The

association of men, whether employers, employees or others, for collective action or dealing, confers no authority over, and must not deny any right of, those who do not desire to act or deal with them.

IV.

The public welfare, the protection of the individual and employment relations require that associations or combinations of employers or employees, or both, must equally be subject to the authority of the State and legally responsible to others and that of their agents.

V.

To develop with due regard for the health, safety and well-being of the individual, the required output of industry is the common social obligation of all engaged therein. The restriction of productive effort or of output by either employer or employee for the purpose of creating an artificial scarcity of the product or of labor is an injury to society.

VI.

The wage of labor must come out of the product of industry and must be earned and measured by its contribution thereto. In order that the worker, in his own and general interest, may develop his full productive capacity, and may thereby earn at least a wage sufficient to sustain him upon a proper standard of living, it is the duty of management to cooperate with him to secure continuous employment suited to his abilities, to furnish incentive and opportunity for improvement, to provide proper safeguards for his health and safety and to encourage him in all practicable ways to increase the value of his productive effort.

VII.

The number of hours in the work day or week in which the maximum output, consistent with the health and well being of the individual can be maintained in a given industry should be ascertained by careful study and should never be exceeded except in case of emergency, and one day of rest in seven, or its equivalent should be provided. The reduction in working hours below such economic limit in order to secure greater leisure for the individual, should be made only with the full understanding and acceptance of the fact that it involves a commensurate loss in the earning power of the workers, a limitation and a shortage of the output of the industry and an

increase in the cost of the product, with all the necessary effect of these things upon the interests of the community and the nation.

VIII.

Adequate means, satisfactory both to the employer and his employees and voluntarily agreed to by them, should be provided for the discussion and adjustment of employment relations and the just and prompt settlement of all disputes that arise.

IX.

When, in the establishment or adjustment of employment relations, the employer and his employees do not deal individually but by mutual consent such dealing is conducted by either party through representatives it is proper for the other party to ask that these representatives shall not be chosen or controlled by, or in such dealing in any degree represent, any outside group or interest in the questions at issue.

X.

The greatest measure of reward and well-being for both employer and employee and the full social value of their service must be sought in the successful conduct and full development of the particular industrial establishment in which they are associated. Intelligent and practical co-operation based upon a mutual recognition of this community of interest, constitutes the true basis of sound industrial relations.

XI.

The State is sovereign and cannot tolerate a divided allegiance on the part of its servants. While the right of government employees—national, state, or municipal—to be heard and to secure consideration and just treatment must be amply safeguarded, the community welfare demands that no combination to prevent or impair the operation of the government, or of any government function shall be permitted.

XII.

In public service activities, the public interest and well being must be the paramount consideration. The power of regulation and protection exercised by the State over the corporation should properly extend to the employees in so far as may be necessary to insure the adequate, continuous and unimpaired operation of public utility service.



Accident Records — How to Compile Them and How to Use Them

(Prepared by the Engineering Department of the National Safety Council)

THE PRINCIPAL PURPOSE of accident records or statistics is to prevent accidents, by

- (a) showing the operating executives and the safety department where accidents are occurring and from what causes, so they may know where to concentrate their efforts for prevention, and
- (b) attracting the attention of workmen, and stimulating rivalry between divisions, shops or departments, so that the superintendents, foremen, and workmen will strive to produce a record which will compare favorably with other departments and with their own past record.

Collecting Accident Data

Accident records, to be of practical value, must include the complete story from the time the accident occurs until the injured person is back at work or the case otherwise adjusted and closed. This requires co-operation between the safety department, medical department or hospital, operating department, employment department, and often the legal or the accounting department. Several members of the Council have found it possible to work out a system which, with a minimum expenditure of time in filling out report blanks, insures that each of these departments will know what the others are doing, and presents a history of the case from which monthly and yearly records may be easily compiled.

While details must be varied to meet local conditions, the general outline of the system used in different industries is fairly uniform. The method and the forms suggested below can be adapted to meet the needs of almost any employer.

Prompt Report Necessary

When an employee is injured, he should report at once to a first-aid station, plant dispensary, or hospital, or to some authorized person who will direct him to a physician. Failure to secure prompt treatment may lead to serious infection.

Daily Record of All Accidents

The medical department, hospital, or **mediate investigation**, make a report

first-aid attendant should keep a daily record of all injury cases which are reported, whether serious or minor. Even apparently trivial injuries may later become serious and result in controversy, and in such cases a record made at the time of injury will prove valuable. This daily record should show the name and check number of the injured, cause and nature of injury, where accident occurred, the treatment given, and disposition of the case. Records of all dressings are usually kept in a book using one line for each case.

Hospital Record Card

In addition to the daily record book the medical department should, at the time the injured employee reports for first treatment, start a "case" record card such as Form 1, and should make suitable entries thereon from time to time until final recovery. Some members use such cards for lost time cases only; others use them for all injuries which require medical attention. Unless the safety department has convenient access to these records, the medical department should send a report to the safety department, giving the necessary information.

Notice of Injury

In the case of all injuries which cause a loss of time, the medical department should at once notify the safety department, the shop foreman, and the employment department. The safety department should be notified so that an investigation may at once be made of the circumstances surrounding the accident. The shop department should be notified so that the foreman also may investigate, make a report of the accident, and correct any hazardous practice or condition. The employment department should be notified so that the cause of absence may be correctly noted. Form 2, Notification of Absence, is typical of the forms used for this purpose and may be used for cases of sickness as well as accident.

In plants having no medical department or first aid room, a report similar to Form 2 should be made out by the person who sends the injured man to the doctor.

Report of Accident

As soon as the foreman is notified of an accident, he should make an im-

(Form 3) and send it to the safety department. In plants having a well organized safety department, a separate investigation is made by an inspector of that department. The results of such investigation may be separately reported on Form 3 or some similar form, including a more complete narration of the accident, description of machinery, etc., and in many cases a sketch or photograph made as soon as possible after the accident.

Report to State

Practically all states now have compensation laws and require a report, on a standard form, for all accidents causing more than a specified loss of time. To insure that such reports will be accurate and complete, they should be filled out by the safety department.

That the report may show correctly the wage of the injured person, it is necessary that the accounting department furnish this information. Since the methods used by various states differ in regard to the calculation of compensation it is necessary that each company instruct the accounting department as to the proper method of computing wages for this purpose.

(To be continued)

For a Small Sum Annually
YOU CAN PUT THE BEST SAFETY
MEN IN THE COUNTRY AT
WORK FOR YOU

THE ACCIDENT PREVENTION services of the National Safety Council represents the combined knowledge of the leading safety men from all the industries of America.

The proper application of safe methods and processes suggested by the Council and the wise use of the educational material supplied to member plants has secured reduction in accidents as high as 75 per cent.

What has been done for these members can be done for you. Write the Business Division for details of membership.

NATIONAL SAFETY COUNCIL

Co-operative—Non-commercial
168 N. Michigan Ave., Chicago, Ill.



NEW MACHINERY EQUIPMENT



New Blasting Machine

THE ATLAS POWDER CO., Philadelphia, Penn., has just placed on the market the "Davis Blaster" No. 1. This is a blasting machine which weighs only 3¼ lbs. It is said to be very powerful for its size, developing sufficient current to fire five 35-ft. copper wire electric blasting caps or five 6-ft. iron wire blasting caps connected in single series.

The dimensions of the Davis No. 1 Blaster are 2-in.x4-in.x4½-in. The outer

which can be depended upon to stay in service the maximum number of days per year, and which can be maintained at a minimum cost for repairs and replacements.

It is not generally advisable to expend any large amount of money to provide permanent road bed for this class of work and consequently the track is a temporary construction, more or less uneven and often times with short curves and wide tie spacing. One of the fundamental considerations therefore is to select a loco-

er, dump or weighing machine. This condition of operation requires an engine which can start cars quickly; operate on rough and uneven track; pull up sharp grades; take sharp curves.

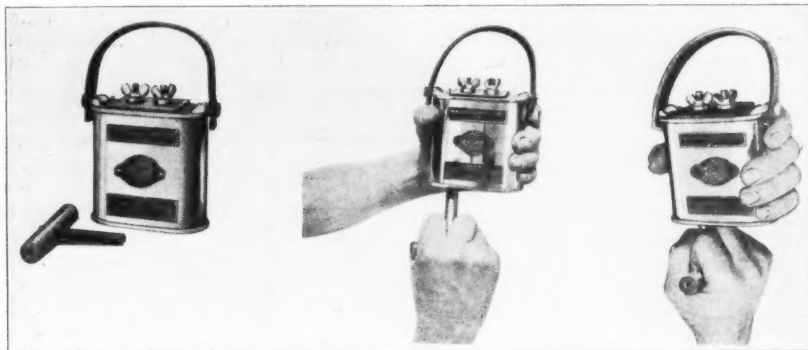
An engine to do this must have flexibility; short rigid wheel base; light unit wheel loads; quick starting; steady pull on grades; good steaming capacity.

The accompanying illustration shows the shay-geared locomotive built by the Lima Locomotive Works. These engines are especially adapted to quarry service and it is claimed that they meet the requirements, outlined above.

The locomotive is supported on two driving trucks, each having a center plate, which permits the truck to turn freely. The frame is stabilized by side bearings so arranged as to permit easy curving and give flexibility. The geared drive gives a very even tractive force at the rim of the driving wheels. This is why the Shay locomotive starts promptly without slipping.

The boilers are arranged to burn either coal, wood or oil and are designed with ample steaming capacity. The small sizes of engines are built for any gauge from 18-in. up. The larger sizes can be built for 36-in. gauge and up. The engines are easily operated, so that an engineer who can operate a traction engine will quickly learn to run one of the Shays with very little instructions.

These designs are the result of years of experience with geared locomotives and the details have been thoroughly worked out with particular reference to the unusual conditions of operation.



New pocket blasting machine of Atlas Powder Co.

case is a seamless brass tube, heavily nicked, with aluminum top and bottom plates. The machine is substantially built to stand hard service. A leather strap (removable) makes carrying easy.

The key by which the Davis No. 1 Blaster is operated is a separate part of the machine and may be kept in the possession of the shot-firer, preventing the operation of the machine by any other person. This is an important safety feature.

The Geared Locomotive in Quarry Service

IN ANY QUARRY OPERATION, or similar service, transportation is undoubtedly one of the most important elements and is vital for the efficient operation of the entire plant. Upon the efficiency, dependability and maintenance of the transportation system hangs the question of whether the entire operation will make a profit to its owner or be a financial loss. The backbone of the transportation system is the motive power, hence, the importance of selecting the type of locomotive which is best suited to the particular kind of service involved. Locomotives are required which will handle the loads in the most efficient way,

motive which will operate satisfactorily upon this character of track with a minimum expense of maintenance both to the track and the engine. Moreover, in many plants there are very sharp grades upon which the locomotive is required to operate the loads. Often times it is necessary to start loads on these grades and spot cars quickly and accurately at the crush-



Shay-geared quarry locomotive

General News from Rock Products Markets

New Use for Sharp Silica Sand

A METHOD HAS BEEN DEvised—and is being actively promoted throughout the country—of permanently bonding plaster to structural surfaces under the name of "Par-Lock" plastering by the Vortex Manufacturing Co., Cleveland, Ohio.

The method or process hermetically seals the structural surface with a pure asphalt compound applied at normal temperatures by compressed air brushes, in successive layers, sufficiently heavy to receive a coarse rock grit.

Rock Grit the Key

Here is where the rock products producer comes in. The rock grit is driven into the asphalt while it is still soft, likewise by compressed-air nozzles, forming rock asphalt mastic, which quickly hardens and presents a rough rock-faced key of minor but uniform suction. This method forms a damp-proof binder and scratch coat to receive ordinary wall plaster.

The rock grit for this purpose is specified as "crushed torpedo gravel, silica or granite of varying size, kiln dried and washed free of loam or dust." This is reduced to pass through a No. 8 sieve and not to exceed 5 per cent to pass through a No. 20 sieve.

It is obvious, from the use made of it, that the grit must be sharp and angular and preferably of silica. A 100-lb. sack of the material will cover between 350 and 400 sq. ft. of wall surface. The Chicago representative of the Vortex Manufacturing Co. is now paying around \$35 per ton for the silica grits in 100-lb. sacks or something like \$1.50 per sack.

This is evidently one of the fields for "rock products" that will be worth investigating.

Phosphate Deposits for Lease

SECRETARY PAYNE, of the Department of the Interior, has approved rules and regulations for the leasing of phosphate deposits in the public lands. About 2,500,000 acres of lands in Wyoming, Idaho, Utah and Montana have been withdrawn from disposition for a number of years awaiting legislation recently enacted by Congress. These regulations will open them to lease in areas not exceeding 2,560 acres each and should add largely to the fertilizer supply of the United States, phosphate forming an important ingredient in commercial fertilizers. Applications for leases are to be filed with the local land offices for transmission to the Secretary of the Interior, and printed copies of the rules and regulations will be available to those officers and to the public as soon as printed.

Great Lakes Sand and Gravel Producers in New Association

TO PROTECT THEIR INTERESTS before the Canadian Government the sand and gravel producers who obtain their material for American markets from Canadian waters have formed the Great Lakes Sand and Gravel Producers Association, with headquarters at Cleveland, Ohio.

The officers are:

President, H. J. Gerhardstein, of the Lake Erie Sand Co., Sandusky, Ohio.

Vice-President, J. S. Scobel, Erie Sand & Gravel Co., Erie, Penn.

Secretary and Treasurer, Jos. T. Farrell, the Homegardner Sand Co., Sandusky, Ohio.

The Executive Committee is composed of the following: Fred W. Ohlemacher, the Kelly Island Line & Transport Co., Sandusky; R. E. DeVille, the DeVille Sand & Gravel Co., Toledo, Ohio; L. E. Williams, the United Fuel & Supply Co., Detroit, Mich.; John H. Cameron, the Cameron Steamship Co., Detroit.

Great Building Revival in Saskatchewan

TWENTY MILLION DOLLARS' worth of new buildings in the Province of Saskatchewan in 1920 is the prediction of a Toronto expert who is in Regina looking over the field and of this sum Regina will account for over \$5,000,000. In his opinion there is not much likelihood of prices coming down this year. Statistics show that in the case of 15 basic building materials prices have advanced 108 per cent since 1914. In iron and steel the peak was reached in 1917, and since then there has been a drop of about 25 per cent. Lumber, paints, and glass show the greatest increases, while in brick and cement the advances have been only moderate.

As regards the Province as a whole, it is estimated that at least 600 new residences and 200 new schoolhouses will be erected. The largest items on the program, however, will be made up of business blocks, warehouses, and Government contracts. Among the last named are the asylum at Weyburn, the Canada Lignite Board plant at Bienfait, Government roads and bridges, courthouses, and the Prince Albert Jail. Besides these, at least 25 bank branches will be erected this year at various points in the Province.

Statistics gathered for all Canada show a marked increase over the year just past, the expenditure for 1920 on new building and construction work being estimated at \$300,000,000 against a total of \$190,000,000 in 1919.

Minnesota Mineral Aggregate Association Is Formed

FOLLOWING the footsteps of Wisconsin producers of sand, gravel and crushed stone, the Minnesota producers have decided it is both possible and feasible to live together in peace and harmony. After various efforts to make going associations of sand and gravel men and crushed-stone men separately, a real live association known as the Minnesota Mineral Aggregate Association is now doing business.

The president of the new association is J. L. Shiely, of the J. L. Shiely Co., St. Paul; J. A. McLaughlin, of the New Ulm Stone Co., New Ulm, is vice-president; secretary, P. J. Asselin, Blue Limestone Co., Minneapolis; and John Wunder, of the Trap Rock Co., and the Blue Limestone Co., Minneapolis, is treasurer.

Members of the executive committee besides Messrs. Shiely, Wunder and McLaughlin, are C. D. Brewer, Duluth Crushed Stone Co., Duluth; J. R. Howes, St. Cloud Crushed Stone Co., St. Cloud; C. P. Biesanz, Biesanz Stone Co., Winona; A. J. Parent, Federal Crushed Stone Co., Jasper; D. W. Radicall, North Star Concrete Co., Mankato, and E. H. Norbloom, of Landers, Morrison, Christenson Co., Minneapolis.

Vast Tonnage of Potash in Nature

SILICATE ROCKS, which are widely distributed over the United States, contain potash in an insoluble combination and in a form which is not available for industrial use, but they are gradually decomposed on exposure to the weather. The potash, thus rendered soluble, is dissolved by rain or ground water, and it finally reaches the ocean or inclosed drainage basins through streams or is absorbed from percolating water by clays, according to the United States Geological Survey, Department of the Interior.

River waters of North America contain an average of 281 parts per million dissolved salts, of which an average of 1.77 per cent is potassium. They carry annually to the ocean 8,339,800 metric tons of potassium, and the river waters of the world carry 57,892,000 metric tons. The annual precipitation of potassium in insoluble form in the ocean is 5,320,000 metric tons, leaving an annual gain of potassium by the ocean of 7,662,000 metric tons. The total potassium content of the ocean is 510,800,000,000,000 metric tons. Ocean water contains 3.30 per cent of salts, of which 1.11 per cent is potassium, corresponding to 1.38 per cent of potash (K₂O).

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone						
City or shipping point	Screenings, ¾ inch down	¾ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.00	1.40 per net ton, all sizes	2.50	2.00	2.00	2.00
Burlington, Vt.	1.80	1.80	1.80	1.65	1.65	2.00@2.25
Coldwater, N. Y.	1.45	2.50	2.40	2.00	1.60	1.45
Grove, Md.	1.00	1.00	1.00	1.00	1.00	1.00
North Leroy and Akron, N. Y.	1.00					
Utica, N. Y.	1.00					
CENTRAL:						
Alden, Ia.	.80	1.50	1.50	1.45		
Alton, Ill.	2.00	1.75	1.75	1.75	1.75	
Bettendorf, Ia.		1.50 per cu. yd., all sizes				
Chicago, Ill.	1.20	1.60	1.30	1.20	1.30	1.20
Cincinnati, Ohio		2.00	2.00	2.00		
Cleveland, Ohio		2.40	2.20	2.20		
Davenport, Ia.	1.50*	1.50*	1.50*	1.50*		
Dundas, Ont.	.75	1.50	1.50	1.35	1.25	1.20
Eden and Knowles, Wis.	1.20	1.20	1.20	1.20	1.20	1.20
Elmhurst, Ill.	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25
Ft. Wayne, Ind.	1.60	1.90	1.90	1.80	1.60	1.60
Greencastle, Ind.	1.25	1.25	1.10	1.10	1.10	1.10
Hull, Canada	2.50	2.30	2.50	2.10	2.00	1.75
Illinois, Southern	2.00	1.50	1.50	1.50	1.50	1.50
Kokomo, Ind.	1.15	1.25	1.25	1.20	1.10	1.10
Krause, or Columbia, Ill.	1.80	1.30	1.50	1.40	1.30	1.30
Lannon, Wis.	1.25	1.25	1.25	1.25	1.25	1.25
Lima, Ohio	1.40	1.40	1.40	1.40	1.40	1.40
Mansfield, Ohio	1.70	2.20	2.00	1.90	1.70	1.70
Mayville, Wis.	1.00	1.20@1.25	1.20@1.25	1.20	1.20	1.10
Montrose, Ia.	1.25	1.75	1.75	1.65@1.75	1.65@1.75	
Oshkosh, Wis.		1.40 per ton, all sizes				
River Rouge, Mich.	1.25	1.50	1.50	1.50	1.50	1.25
Silica, Ohio	1.00	1.50	1.30	1.20	1.00	1.00
St. Louis, Mo.	.60	1.60				
Toledo, Ohio, f. o. b. cars	1.60	2.10	1.90	1.80	1.60	1.60
Toronto, Canada	1.55	2.25	2.25	2.25	2.05	2.00
Winnipeg, f.o.b. cars	2.90*		3.25*	2.90*		
SOUTHERN:						
Brooksville, Fla.	1.50			3.00		
Cartersville, Ga.		2.75	2.75	2.75	2.75	2.75
Chickamauga, Tenn.	1.50	1.75	1.75	1.75	1.75	1.75
El Paso, Tex.	1.00	1.00	1.00	1.00		
Fort Springs, W. Va.	1.30	1.50	1.80	1.75	1.50	1.40
Mascot, Tenn.		1.50	1.50@1.75	1.50@1.75	1.50@1.75	
Memphis Jct., Ky.			1.10@1.35, all sizes			
New Braunfels, Tex.	.60	1.75	1.75	1.50	1.50	1.50
WESTERN:						
Atchison, Kans.	.50	2.00	2.00	2.00	1.90	1.90
Blue Springs and Wymore, Neb.	.20	1.85	1.85	1.75@1.80	1.65@1.70	1.60
Kansas City, Mo.	.60	2.00				
Lannon, Minn.				1.75	1.50	
Terminus, Calif.		1.00			.90	

Crushed Trap Rock						
City or shipping point	Screenings, ¾ inch down	¾ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Bernardsville, N. J.	2.00	2.20	2.00	1.80	1.50	
Branford, Conn.	.80	1.75	1.65	1.45	1.25	
Birdsboro, Pa.	1.40	1.90	1.80	1.60	1.40	1.40
Bound Brook, N. J.	2.10	2.20	2.00	1.80	1.60	
Dresser Jct., Wis.	.75	2.50	2.45	2.15	2.00	2.00
Duluth, Minn.	1.00	2.25	2.00	1.50	1.50	
E. Summit, N. J.	2.10	2.35	2.15	1.80	1.85	
Glen Mills, Pa.	1.00	1.35	1.70	1.55	1.35	1.35
Millington and Paterson, N. J.	1.80	2.20	2.00	1.80	1.60	
New Britain, Middlefield, Rocky Hill, Meriden, Conn.	.60@1.00	1.60@1.80	1.60@1.80	1.40@1.50	1.20@1.30	
Westfield, Mass.	.60	1.35	1.30	1.20	1.10	

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¾ inch down	¾ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Dundas, Ont.—Flint	1.10	1.10	1.10	1.10	1.10	1.10
Mayville, Wis.	.90@1.00	1.10@1.25	1.10@1.25	1.10@1.25	1.10@1.25	1.10@1.25
Middlebrook, Mo.—Granite	4.00	2.00	2.00			1.50†
Portland, Maine—Granite	1.50					
Roseburg, Ore.		1.50	1.25	1.05	1.00	1.00
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75	
White Haven, Pa.—Sandstone	.85	1.20	1.40	1.20	1.20	1.20
Granite	1.25		1.50	1.50	.50	

*Cubic yard. †Agril. lime. ‡R. R. ballast. §Flux. ¶Rip-rap. a 3-inch and less.

Agricultural Limestone

EASTERN:	
Coldwater, N. Y.—Analysis, 56.77% CaCo ₃ , 41.74% MgCo ₃ —70% thru 200-mesh, 95% thru 40-mesh; bags, \$5.00; bulk	3.25
Chamont, N. Y.—Analysis: CaCo ₃ , 92 to 98%; MgCo ₃ , 1.51%—(Thru 100 mesh); sacks, 4.00; bulk	2.50
Grove City, Pa.—Analysis: CaCo ₃ , 94.75%; MgCo ₃ , 1.20%—(70% thru 100 mesh); 80 lb. ppr., 4.60; bulk	3.25
Grove, Md.—(50% thru 50 mesh); paper bags, 6.75; bulk	5.00
Hillsville, Pa.—Analysis, CaCo ₃ , 96% (70% thru 100 mesh); sacks, 4.50; bulk	2.75
Jamesville, N. Y.—68% thru 100 mesh; 95% thru 50; 100% thru 20. Sacks, 3.75; bulk	2.25
Syracuse, N. Y.—Analysis, 90% carbonates (50% thru 100 mesh, 90% thru 50 mesh); sacks, 3.50; bulk	1.75
Walford, Pa.—(70% thru 100 mesh; 85% thru 50; 50% thru 50; 100% thru 4); sacked, 4.25; bulk	2.75
West Stockbridge, Mass.—Analysis: Combined carbonate, 95%—33% thru 200 mesh; 66% thru 100; 100% thru 40. Bulk	2.85
Williamsport, Pa.—Analysis, CaCo ₃ , 88-90%; MgCo ₃ , 3-4%—(50% thru 50 mesh); bulk	4.00
CENTRAL:	
Alden, Ia.—Analysis, CaCo ₃ , 99.16%; bulk	.80
Alton, Ill.—Analysis: CaCo ₃ , 96%; MgCo ₃ , 0.75%—50% thru 4 mesh	2.50
Bedford, Ind.—(90% thru 10 mesh) Analysis, CaCo ₃ , 98.5%; MgCo ₃ , 0.5%	1.75
Belleville, Ont.—Analysis, CaCo ₃ , 90.9%; MgCo ₃ , 1.15% (45 to 50% thru 100 mesh; 61 to 70% thru 50 mesh); bulk	2.50
Chicago, Ill.—Analysis, CaCo ₃ , 53.63%; MgCo ₃ , 37.51%—90% thru 50 mesh	1.00
Columbia, Ill., near East St. Louis (¾" down)	1.25@1.80
Ellettsville, Ind.—Analysis, Carbonate, 98%	2.80
Elmhurst, Ill.—(Analysis, CaCo ₃ , 35.73%; MgCo ₃ , 20.69%) 50% thru 50 mesh	1.25
Greencastle, Ind.—(Analysis, CaCo ₃ , 98%) 50% thru 50 mesh	1.75
Howenstein, O.—100% thru 10 mesh; 59% thru 50; 39% thru 100	2.75@3.00
Kansas City—(50% thru 50 mesh)	2.00
Lannon, Wis.—(90% thru 50 mesh) Analysis, 54%, CaCo ₃ ; 44%, MgCo ₃	2.00
Marblehead, O.—(Analysis: CaCo ₃ , 95.33%) 100% thru 100 mesh, sacks, 4.75; bulk	2.75
McCook, Ill.—Analysis, CaCo ₃ , 54.10%; MgCo ₃ , 45.04%—100% thru ¾-in. sieve; 78.12% thru No. 10; 53.29% thru No. 20; 38.14% thru No. 30; 34.86% thru No. 50; 22% thru 100	1.50
Milltown, Ind.—Analysis, CaCo ₃ , 94%; MgCo ₃ , 3%—(100% thru 4 mesh)	1.50
Montrose, Ia.—(90% thru 100 mesh)	1.25
Prussia, O.—Analysis: CaCo ₃ , 82.8%; MgCo ₃ , 8.2%; neutralizing power in terms of calcium carbonate, 95.3%—50% thru 100 mesh; bulk	2.75@4.50
Rockford, Ill.	1.50
St. Louis, Ill. (near East St. Louis on I. C. R. R.)—(Thru ¾" mesh) Analysis, CaCo ₃ , 89.61 to 89.91%; MgCo ₃ , 3.82%	2.00
St. Paul, Ind.—Analysis, CaCo ₃ , 85%; MgCo ₃ , 12%	1.50
Stone City, Ia.—Analysis, CaCo ₃ , 98% (50% thru 100 mesh)	.80
Toledo, O.—Analysis, CaCo ₃ , 52.72%; MgCo ₃ , 43%—(20% thru 100 mesh); 30% thru 50; 80% thru 100; 100% thru 5/32 screen	1.90
Whitehill, Ill.—Analysis, CaCo ₃ , 96.12%; MgCo ₃ , 2.50%—50% thru 100 mesh	2.00

(Continued on next page.)

General News from Rock Products Markets

California May Stop All Highway Work

CALIFORNIA HIGHWAY WORK will soon be stopped, according to general opinion at the capitol, except for a few units nearing completion if considered necessary because they form an important part of a main highway.

It is impossible at this time to obtain a statement from those in charge of the work. Marshall De Motte and Clyde Seavey, of the State Board of Control, and Charles Witmore, of the Highway Commission, are in conference with Governor Stephens on the highway situation. A. B. Fletcher, chief highway engineer, favors stopping highway work. He calls attention to the demand of hoisting and operating engineers for \$10 a day and of rapidly rising costs all along the line. He is of the opinion that it is impossible to build roads economically at the present time.

Inability of the state to sell highway bonds because of the low interest rate they bear is the principal reason for stopping work, however.—M. E. Baudin, Sacramento, Calif., June 3, 1920.

Chicago Steam-Shovel Men Strike for \$1.50 an Hour

EXCAVATION WORK for new buildings in Chicago, which was to have been started June 14, has been postponed indefinitely through a strike of 75 steam-shovel engineers. They have been receiving \$1.05 an hour. They demand \$1.50 an hour.

The employers have refused the increase.

W. J. Swegman Joins J. C. Buckbee Company Engineering Staff

J. C. BUCKBEE, president of the J. C. Buckbee Co., Engineers, First National Bank Building, Chicago, announces the addition to his staff of W. J. Swegman, graduate engineer, who has had a large amount of experience designing, building and operating cement plants, also experience in crushing and grinding of various other materials, power-plant construction and general engineering.

Mr. Swegman graduated from Purdue University in 1906, starting with the St. Louis Portland Cement Co., following which he was engaged by the Superior Portland Cement Co., the Texas Portland Cement Co., the Freeborn Engineering Co., the Ebro Irrigation & Power Co., of Barcelona, Spain, the Hunt Engineering Co., and as superintendent and mechanical engineer for the Wabash Portland Cement Co., and mechanical engineer for the

Lambert Chemical & Acid Co. He returned to the Wabash Portland Cement Co. as mechanical engineer for further additional improvements one year ago, and having recently finished this work has joined the Buckbee Co. organization.

Arkansas Commission Believes It Can Force Reduction in Freight Rates

IN A COMMUNICATION to V. P. Knott, state highway engineer, T. H. MacDonald, chief of the Bureau of Public Roads, Washington, D. C., declared that according to a decision of the chairman of the Interstate Commerce Commission, a 10-cent net ton reduction by railroads on road materials was optional, and that they had ample authority to increase their rates on these materials after the Federal government relinquished control of the roads.

Mr. MacDonald enclosed in his communication to Mr. Knott a letter from him to Clyde B. Aitchinson, chairman of the commission, in which he gave as his view that inasmuch as the provisions affecting rates on road materials were not in effect until after February 29, the roads had no authority to increase their rates on these materials.

The rates of the railroads, however, Mr. Aitchinson said, were subject to change by state or federal authorities.

The Arkansas Corporation Commission, which recently heard a petition of the Texarkana Gravel Co. for a 10-cent net ton reduction on sand, gravel, crushed rock, and like road materials, has not yet issued an order in the case, but is expected to within a short time. Members of the commission said recently that they had ample jurisdiction in the case, affecting all rates where shipments originated and terminated within the boundaries of the state, and that its order, when issued, would be effective whether for an increase or reduction.

Storage Bins for Agricultural Limestone

EARL G. BARNES, of Soils Department, Agricultural College, Ohio State University, Columbus, Ohio, states that the Engineering Department is at work preparing plans and specifications for agricultural limestone storage bins. He expects to have such plans ready for wooden bins in next two or three weeks. A little later plans for a concrete bin will be prepared. Mr. Barnes has been doing missionary work in Eastern and Southwestern Ohio, urging the use of "Agriculture."

Big New Iowa Gravel Producer Coming

WHAT PROMISES to be one of the largest sand and gravel enterprises in the state is the Niles Sand and Gravel Co., Charles City, Iowa, which is now opening up a pit at Niles on the Little Cedar River, near Charles City. As noted in ROCK PRODUCTS, June 5, this company is incorporated for \$300,000. E. R. Ernsberger is president; M. W. Ellis, vice-president; W. B. Johnson, secretary, and G. C. Blunt, treasurer; all of Charles City.

Local reports state that the machinery has arrived and that construction commenced June 1. The new plant will have a capacity of 100 tons of gravel an hour and as it is planned to operate twenty-four hours a day, this will mean an output of 2,000 tons or fifty cars a day. A large percentage of the output is already sold it is said.

The Charles City Western Railway has purchased a large number of new cars and the sidetrack has been completed to the new plant.

New Talc Company at Henry, Virginia

THE BLUE RIDGE TALC CO., Henry, Va., has secured control of the old Franklin Soapstone Products Corp. and is getting ready to resume operations.

The new concern will put in additional pulverizing equipment and an air separating system to produce 350-mesh talc for the paint trade. It will build a rock storage of about 3,500 tons capacity, in which rock will be air dried as well as stored against bad weather and breakdowns between mill and mine, which is located about $\frac{3}{4}$ of a mile from the mill.

Rock is hauled to the mill with 21-ton steam locomotive in 4-yard "Western" dump cars. Rock will be dumped into the storage direct from the cars, a track for which comes into the building on a level with the eaves. The rock will be reclaimed from storage by a belt conveyor running directly under this track the entire length of the building.

Machinery will probably be installed during the early fall for sawing crayons and insulators. In addition to talc and soapstone deposits secured with the Franklin property the new company holds mineral leases on over 300 acres of other deposits lying within four miles of its mill.

The officers of the new company are C. D. Bryant, president; J. H. Pritchett, vice-president and C. O. Kitson, secretary-treasurer.



Passed By The Screen



Incorporations

The Lake Ontario Sand Co., Rochester, N. Y., has increased its capitalization from \$17,000 to \$75,000.

The Janesville Sand and Gravel Co., Janesville, Wis., has increased its capitalization from \$100,000 to \$200,000.

The Alexander Granite and Land Co., Statesville, N. C., has been incorporated for \$100,000 by J. B. Roach.

The Diamond Construction Co., Milwaukee, Wis., has been incorporated for \$8,000 to deal in building materials.

The Peerless Granite Co., Little Falls, Minn., has been incorporated for \$25,000 by E. R. Johnson, T. Herbert and V. L. Carlson.

The Martin-Arnold Sand Co., New Philadelphia, Ohio, has been incorporated for \$3,125 by E. S. Martin, C. E. Wood and J. B. Oviatt.

The H. H. Robertson Co., First National Bank Bldg., Pittsburgh, Penn., has obtained a license to deal in building materials in Wisconsin.

The Silica Products Co., Cleveland, Ohio, has been incorporated for \$20,000 by G. Abbot, T. H. Jones, L. Nichols, J. P. Wood and W. T. Kinder.

The American Stone and Gravel Co., Pawtucket, R. I., has been incorporated for \$150,000 by F. Eighme, J. C. Polin, A. E. Lagarde and G. O. Gaudette.

The Harbison-Walker Mining Co., Pittsburgh, Pa., has been incorporated with a capital of \$35,000 to mine and quarry clay, ganster rock and other minerals.

The Rock-West Lone Rock Co., West Line, Mo., has been incorporated for \$150,000 by J. W. Weisser, West Line, Mo.; E. E. and O. E. Hairgrove, Kansas City, Mo.

The Madko Concrete Products Co., Madison, Wis., has increased its capital stock from \$25,000 to \$50,000 to manufacture concrete blocks, culvert pipe, etc. This company will utilize the Wilcox sand pit at Janesville, Wis.

The Ornamental Plastering Co., Milwaukee, Wis., has been incorporated for \$35,000 to manufacture and deal in all kinds of building materials. The incorporators are Otto H. Papke, C. Kuehns and Chas. F. Puls, Jr.

The Concrete Products Corporation, West Liberty, Iowa, has been incorporated for \$500,000 to manufacture, deal in, and build with, metal, stone, brick, cement, etc. The incorporators are John H. Trey, president; Glenn Fairall, vice-president, and R. O. Deevey, secretary, all of West Liberty, and Norman Huyck, of Des Moines, treasurer.

Sand and Gravel

H. D. Conkey & Co., Mendota, Ill., has recently purchased additional river frontage at Oregon, Ill., and it is reported will erect a new large sand and gravel plant second to none in the state. C. J. Behler is in charge.

Oklahoma City, Okla.—An ordinance to require all persons who contemplate digging sand pits within the city limits to file a sufficient bond to cause them to refill the pits, is being drafted by the municipal attorney's office.

The Pioneer Sand and Gravel Co., Seattle, Wash., is building a large concrete dock and loading hopper on the city waterfront. The company's plant is at Steilacoon, near the head of Puget Sound and the sand and gravel are brought to the city waterfront in barges of about 400 tons capacity. Clam-shell buckets and derricks are used to unload them.

W. T. Main, division engineer of the Chicago & Northwestern Ry., with headquarters at Eagle Grove, Iowa, was in Alagona, Iowa, recently, inspecting the abandoned gravel pit owned by the C. & N. W. The site of the former gravel pit may be utilized as yardage for the proposed new gravel pit, to be opened soon west of Irvington by Fort Dodge capitalists.

The Utica Sand & Gravel Co. has bought from Michael F. Lyons of Clayville, N. Y., the big sand and gravel bed located on his property, Paradise Park, between Clayville and Cassville, N. Y., and will market the sand and gravel all once. Five million tons of sand and gravel will

be taken from the bed to Utica and nearby places by auto truck, it was announced by the company.

The Centlivier Sand & Gravel Co., Ft. Wayne, Ind., has filed a certificate of preliminary dissolution.

The A. Y. Reed Gravel Co., Elgin, Ill., suffered a \$5,000 loss recently when a fire destroyed a large stripping machine.

Bellevue, Iowa, reports that an immense deposit of road building gravel has been located several miles north of Bellevue and gives wonderful promise for the future. In what was undoubtedly the bed of the Mississippi river during a period in glacial ages, there appears to be millions of tons of good road building gravel accessible by rail to a considerable group of counties that are known to be lacking in deposits of high class material of their own. These counties are Dubuque, Jackson, Clinton, Buchanan, Jones, Cedar and Linn. This deposit extends along the river between two and three miles and its greatest width is something over half a mile. The depth of the deposit may run from 50 to 60 ft. at the river's edge of the terrace to a very slight depth at the opposite side. Gravel is being pumped from a depth of 20 ft. below water line and extends 40 ft. above, so that there is in sight at this particular point at least 60 ft. Investigations which have been made are sufficient to indicate that there are in the terrace millions of yards of gravel awaiting development.

Lime

The Cedarville Lime Co., Cedarville, Ohio, has amended the articles of incorporation to increase the capital from \$40,000 to \$65,000.

The Standard Stone & Lime Co., Harrisonburg, Va., had six of its sheds destroyed by fire, resulting in damage amounting to \$20,000. The blaze is supposed to have originated from one of the kilns.

The Knickerbocker Portland Cement Co., Greenport, N. Y., had the upper story of a large building, part of which was used as a stock room, destroyed by fire. The cause is unknown, and the damage was considerable.

Evansville, Ind.—Charles Streithof, superintendent of the water-works department, at a meeting last night of the board of trustees, was authorized to advertise for bids for 25,000 bushels of lime to be used during the coming year at the pumping station and filtration plant.

The Luckey Lime and Supply Co., Luckey, Ohio, it is reported, will erect a hydrated lime plant that will have a daily capacity of 150 tons. The property site consists of 61 acres. On it will be built stone crushing, hydrating and calcining plants. The amount of stone that can be quarried in the acreage is estimated at more than 10,000,000 tons, which would not be exhausted in 100 years.

Cement

The cement industry in the Lehigh Valley is seriously affected by shortage of freight cars and unless relief is obtained many mills will close down, being overstocked. The Alpha Portland Cement Co. has a million barrels in storage at Martin's Creek alone. During the last ten days it was able to obtain but 11 per cent of its requirements of cars.

Cement has been so scarce in Queensboro, New York City, that the arrival of three car loads is heralded in the newspapers. The superintendent of the Borough Building Bureau is quoted as saying: "The fact that three carloads of cement have reached Queens is one of the most hopeful things that has happened in some time. Building conditions in other boroughs are reported to be in bad condition but Queens is going ahead and outstripping them all. This is due to the energy which our builders have displayed."

The Southwestern Portland Cement Co. is making improvements which will double the manufacturing capacity of its plant at Victorville, Calif. The work represents an investment of \$250,000 and is under the supervision of the superintendent of the company, P. S. Taylor.

The improvements consist principally in the construction of another kiln and the installation of additional machinery for grinding the product. The new kiln will be built parallel to the one now in operation and the foundation has already been laid. Materials and machinery are on the ground or in transit for the completion of the work, and in spite of the present labor shortage the management plans to have the plant improvements completed by July first.

Quarries

The Racine Stone Co., Racine, Wis., was adjudicated bankrupt on June 4, 1920.

Uvalde Rock Asphalt Co., Beaumont, Texas, increased its capital stock from \$300,000 to \$600,000.

The Connecticut Quarries Co., New Haven, Conn., has increased its capital from \$575,000 to \$650,000.

The National Granite Co., 418 Wisconsin St., Eau Claire, Wis., dealers in monuments, etc., has increased its capital stock from \$50,000 to \$100,000.

The Hastings Stone Co., Minneapolis, Minn., is busily making arrangements for the opening of a quarry in the southeastern part of the city. C. R. Hagen is president and J. C. McCulloch will be manager.

The Union Stone Co., Saginaw, Pa., has started work on a new stone crusher on the site where the one stood which was burned several weeks ago. The new machine is much larger than the old one and will be run with electricity.

Mahony & Rich Quarries, Ltd., Ottawa, Ont., have been incorporated with a capital of \$50,000 to quarry, crush and deal in stone, gravel, cement products, plaster, etc. They will purchase the quarry leasehold of Walter W. Wright, Hull, Que.

The Tri-City Stone Co., Illmo, Mo., has been incorporated for \$25,000 to manufacture limestone fertilizer and crushed rock. The officers are George Arnold, president; V. J. Burg, vice president; W. L. Avery, secretary, and George Weier, treasurer.

The St. Joseph Quarries, St. Joseph, Mo., filed a notice in the county recorder's office that the capital stock of the company had been increased from \$30,000 to \$60,000 and that the number of directors had been increased from five to seven shareholders.

The Wausau Abrasive Co., which recently purchased the Wausau, Wis., holdings of the Wausau Quartz Co. and the United Mineral Co.'s mines and crushing plant at Wilmot, N. H., including three garnet mines, will at once commence the erection of a building, 60x240 ft., on a site recently acquired at Wausau.

Wm. Anderson and associates have organized Light Pink Marble Co., with capital stock of \$100,000. This corporation has valuable properties near Louisville, Tenn., and will begin developments at once, employing a large force of men in opening up the quarry. S. A. Rodgers formerly with Candora Marble Co., sold his holdings to the new corporation and will act as manager in developing the property. Mr. Rodgers has been actively engaged in the marble industry in Knoxville for more than thirty years and is well versed in marble properties. His wide experience and knowledge make him a valuable man for Light Pink Marble Company.

A deal has been consummated between the J. B. Nelson Quarrying Co., Llano, Texas, and Fred Kothr, whereby the former becomes the owner of the quarry, which has heretofore been owned and operated by Mr. Rothe. H. S. Fox, Jr., of Houston, is president of the company; O. M. Lippen is vice president, and J. B. Nelson will be secretary-treasurer and general manager of the company. The new company expects to install some new machinery and equipment and be in position to turn out large quantities of granite. The granite industry in this country is fast becoming the greatest industry we have, and the pay roll of the companies is increasing all the time. Several tractors and large trucks are used in hauling the granite from the quarries to the railroad.



Passed By The Screens



Tyndall Quarry Co., Ltd., Winnipeg, has decreased its capital from \$250,000 to \$193,000.

The Pond Hill Crushed Stone Co., Pond Hill, Pa., which was recently purchased by Peter Bohn and M. J. Gallagher, has resumed operation and shipment of stone. The plant, which had been idle for over two years, was formerly the Luzerne County Crushed Stone Co. The Pennsylvania Railroad has contracted to take the entire output of ballast rock for its tracks, and several state highway contractors will take large shipments of material. The stone from this quarry is of high grade, equal to trap rock and has passed all tests for its use on highways.

The Olive Hill Limestone Co. at Olive Hill, Ky., is one of the largest stone quarries of the state of Kentucky. It is the result of the consolidation of three small companies. As the demand for stone grew in this district of Kentucky these small plants tried to expand but in 1917 were consolidated into the present company. At this time the company not only produces all commercial stone and ballast, but also considerable agricultural limestone. The officers of the company are R. A. Carpenter, president; J. H. Mobley, vice president; H. W. Hillman, treasurer and general manager, and W. S. King, secretary.

The Olivine Co., of Milwaukee is making a success in a new line of industry, the reduction of the trap rock of northern Michigan for use in the manufacture of asphalt shingles and for road metal. It has just arranged, through W. L. Fisher, its construction superintendent, for the installation of new equipment at its rock crushing plant in the city of Marquette, Mich., which will increase the capacity to 300 tons a day. The Olivine company is operating three new plants. Two are in Marquette and one is in Republic. The largest Marquette plant is the Grove street quarry where 30 men are employed and a daily output of 100 tons of crushed rock is the capacity. The other Marquette quarry is at the southern limits of the city, near the upper peninsula branch state prison. The company plans to enlarge its Grove street plant by the addition of another electric crushing unit so that its daily output will run to 300 tons a day. When this capacity is reached the plant will employ 100 men. It is expected that the new equipment will be installed within a short time and when the crushers are in operation the plant will use 600 horsepower.

The Limestone Products Co. is a new company organized by J. F. Halloran, J. E. Hollingsworth, L. J. Moss, S. W. Portlock of Memphis and John T. Woodruff of Springfield, Mo. The company has acquired a large deposit of limestone over a mile in length and ranging from 15 to 80 feet in height, on the west bank of Black River at Black Rock, Ark., where the new company is installing a large crushing plant and lime kilns. The primary object of the company is to supply crushed stone for the many highway enterprises now under way in eastern Arkansas, western Tennessee and northern Mississippi. The new company is installing the most modern and up-to-date crushing plant in the South. The daily output is 1,500 tons. The company is constructing its own tracks connecting with the Frisco railroad and also a track connecting with the Black River, where material will be shipped by barge to Mississippi River points. The capital of the company is \$100,000, fully paid. In speaking of the new enterprise, Mr. Hollingsworth, who is vice president and general manager, said: "Our limestone deposit is something unusual. It runs high in percentages of carbonate of lime and magnesia and while our early operations will be confined to crushing and marketing stone for construction work and road building, our ultimate field of operations will be directed to pulverizing this high grade limestone for fertilizer. An analysis of the stone shows it to be equal to any in the country and our close proximity to the soils where it is most needed will enable us to supply this material in very large quantities at the minimum cost." The officers of the company are: John T. Woodruff, president; J. E. Hollingsworth, vice president and general manager; S. W. Portlock, secretary and treasurer.

Manufacturers

The Worthington Pump and Machinery Corp., 115 Broadway, New York City, announces that

it has added hydraulic machinery to its various other lines.

The Eastern Car and Construction Co. announces the removal of its general offices from 30 Church Street to 50 Church Street, New York City, N. Y.

The Winther Motor Truck Co., Kenosha, Wis., has broken ground for a large addition to its present plant, and it is anticipated that the new building will be completed and ready for occupancy about August 30.

The Ludlow-Saylor Wire Co., St. Louis, Mo., manufacturers of the "Perfect" double-crimped wire cloth and mining screens for all purposes, have just issued a price list to Catalogue No. 45. This 80-page booklet is full of interesting and instructive information relative to the gauge of the wire, mesh and space between wires of all of the types and sizes of screens manufactured by the company.

The Webster Manufacturing Co., executive offices in Chicago and plant at Tiffin, Ohio, since the purchase of the Skillin and Richards Manufacturing Co., in June, 1918, has added a new building to that plant which will increase its capacity about 50 per cent. The receiving and shipping facilities have been improved, a sprinkler system installed and the plant made thoroughly up-to-date in all respects. The Webster Company does consulting engineering work and foundry and machine work. The sales office of the McCormick Building, Chicago, and the general offices and engineering staff at Tiffin now occupy space in the new office buildings at 4500-4560 Cortland St., Chicago.

Phosphate

The Merchants' Fertilizer and Phosphate Co., Charleston, S. C., is enlarging its fertilizer shed.

The Robin Jones Phosphate Co., Nashville, Tenn., are now booking orders for summer and fall delivery of finely ground raw rock phosphate.

The McGuire Fertilizer and Phosphate Co., Hastings, Fla., will erect an acid chamber and mixing plant; also a farmers' supply house and co-operative barrel factory. At Leesburg, Fla., this same company will erect a two-story and basement 176 by 70 ft. building. The machinery has already been ordered.

The Southern Phosphate Corporation will install mining plants at Lakeland, Ridgewood, Mulberry and Tancred, Fla. They will install 6 dryers (capacity 1,000 tons), turbines, motors, washers, pumps, etc. The machinery has already been purchased. O. J. Ridenour, 25 Broad St., New York, is president and general manager; L. W. Cottman, 810 Keyser Blvd., Baltimore, Md., construction engineer; W. F. Carey & Co., 96 Wall St., New York, contractors. The company will develop 10,150 acres.

Gypsum Products

The Empire Wall Plaster Co., Utica, N. Y., has increased its capital from \$25,000 to \$50,000.

The Ebary Fireproofing and Gypsum Block Co., Caledonia, N. Y., which took over the plant of the old Consolidated Wheatland Plaster Co., at Wheatland more than a year ago, has just completed a brick addition to the west end of the mill and is installing in it some new machinery for the crushing of rock brought out of the mine. A slope has been dug in the mine, leading up into this new building, and the rock will be hauled up from where it is dug to the crushing machinery instead of bringing it to a shaft and hoisting it out as before. The new addition is 36 ft. square, 36 ft. high at the north end and 25 ft. high at the south end. The big chunks of rock as they come from the miners' hands are here put through a large size crusher and broken up into a size such as can be put into the grinding mills and reduce it to powder for calcining. The new crusher is on the ground and will be put into operation as soon as it can be set and power connected with it. Some 35 men are now employed at this plant. Wood fibre plaster, calcined rock, land plaster and crushed rock are being shipped out to the trade from this point. The company put into operation last Monday a truck which is being used to transport its workmen to and from Caledonia and Mumford and its plants at Wheatland and Garbutt.

The United States Gypsum Co.'s net profits for the first quarter of 1920 show an improvement of 400 per cent, compared with a year ago. This year the company earned \$280,000, a rate of approximately 18 per cent per annum on the common stock. Earnings for the first quarter of 1919 were \$70,000. Sales for the first quarter of this year were \$2,300,000, which compares with \$1,000,000 a year ago. The first quarter's earnings were more than sufficient to pay the \$4 common dividend for the entire year. Officials of the company state that 99 per cent of the old stock has consented to the recapitalization plan, insuring its success. The company will be re-incorporated in Illinois. In exchange for the \$3,904,900 of \$100 par common outstanding the company will issue \$3,904,900 of \$20 par stock, making the exchange on a 5 for 1 basis. The \$5,959,500 of preferred will be exchanged on a share for share basis. The new preferred will be tax exempt in Illinois.

Retail Dealers

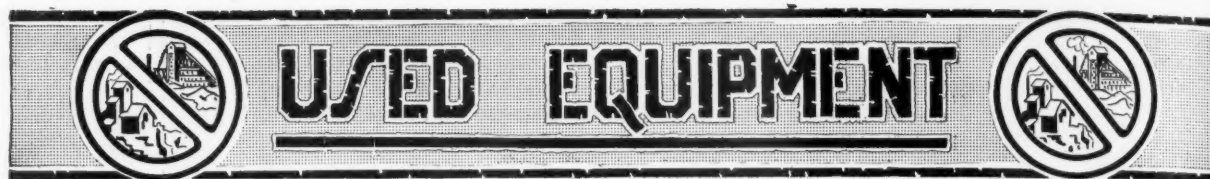
The Dakota Concrete Stone Co., Sioux Falls, S. D., has been incorporated for \$100,000 by S. H. Edmunds, J. B. Wildberger and A. L. Edmunds.

The Frank E. Morse Co., New York, N. Y., has moved to the Staten Island Terminal Building at the foot of Whitehall Street, New York City, N. Y.

The Lewiston Concrete Culvert Co., Lewiston, Mont., has filed articles of incorporation, being organized to manufacture culverts and other concrete products on a large scale. It is capitalized for \$40,000, and now has a large plant in operation, this having been formerly conducted as a private enterprise. The directors are J. E. Miller, J. R. Miller and O. O. Mueller.

The Manitoba Self-Locking Concrete Wall Co., operating the Sawyer system of hollow concrete wall construction, has been formed to operate in the province of Manitoba and the territory eastward towards Fort William. They are installing their plant at Winnipeg. The company includes John W. Sifton, Douglas Laird, Edward Kelly, and Mr. Haven. The company looks forward to building many grain elevators in Western Canada by the Sawyer system. They expect to have three or four plants turning out blocks this year and to have at least a 15,000 ft. per day production before the season is over. Chris Simpson, one of the company, and Mr. Ross are supervising the building of the Winnipeg plant. Orders for over 100,000 ft. are already on hand.

The Standard Fuel and Material Co., recently organized with C. G. Kershaw, president; J. I. McCants, vice president; W. D. Lewis, Jr., secretary and sales manager, and W. H. Brooks, treasurer, has started out actively in the fuel and building material business at Birmingham, Ala. It shall be the purpose of this new company to reach out into the Southern States as fast as possible with a complete line of building supplies and also coal for industrial and domestic use. J. I. McCants and W. D. Lewis, Jr., need no introduction in building circles, as each of these gentlemen have been intimately identified with the building industry for a number of years. Mr. McCants will be remembered with the old Standard Portland Cement Co., with which he was associated in the capacity of manager of sales and traffic for a number of years; in fact, he was connected with the Standard Portland Cement Co. from its very inception until it was taken over by the Atlas Portland Cement Co. of New York, and Mr. Lewis will also be remembered by his many friends as having been with the Standard Portland Cement Co., for which concern he served in the capacity of assistant sales and traffic manager for something over 10 years. Several months after the Standard Portland Cement Co. sold out these gentlemen decided to capitalize their wide experience and identity throughout the building circles in the South, which is responsible for the opening of the Standard Fuel & Material Co., with every promise of making a tremendous success. Messrs. McCants and Lewis are widely known among dealers, contractors, architects and engineers throughout the entire South and have a host of friends who will be pleased to learn of their new venture. The Standard Fuel & Material Co. would be glad to communicate with manufacturers and shippers of building supplies for Southern territory representation.



Rates for advertising in the Used Equipment Department: \$2.50 per column inch per insertion. Minimum charge, \$2.50. Please send check with your order. These ads must be paid in advance of insertion.

Repaired Contractors' Equipment

Steam Shovels

Model 60 Marion Shovels, 2½-yard dippers, Nos. 1999, 2059

- 1—Model 70 Marion, 2½-yd. dipper, Shop No. 2693.
- 1—Model O Thew, ½-yard dipper, full revolving, on traction wheels.

Hoisting Engines

- 1—8½ x 10 DC 2-D Lambert, with boiler
- 1—6 x 10" DC 2-D Byers.
- 1—6¼ x 10 DC 2-D Mundy, with attached swinger and boiler

Cableway

- 1—Lidgerwood Cableway, 1164-ft. span, with 9 x 10" DC Reversible Link Motion Cableway Engine, 3-ton capacity

We have a large stock of thoroughly repaired Construction Equipment of all kinds ready for immediate shipment.

Locomotives

- 1—14 x 20" standard gauge saddle tank Locomotive.
- 2—American 10 x 16" Locomotives, 36" gauge, with butt joint boilers
- 4—18-ton 10 x 16" Dinkeys, 36" gauge

Clam Shell Buckets

- 1—1½-yard Browning.

Cars

- 20—12-yard Western Air Dump, standard gauge, 26 ft. bed.

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Union Arcade

Pittsburgh, Pa.

For Sale

ENGINES

- One (1) 22-in. by 42-in. Hamilton Corliss.
- One (1) 12-in. by 16-in. Horizontal Side Crank.
- One (1) 10-in. by 12-in. J. B. Alfree Horizontal, Center Crank.

BOILERS

- Four (4) 72-in. by 18-ft. Horizontal Tubular.

PUMPS

- One (1) 12-in. by 12-in. by 15-in. Laidlow, Dunn, Gordon duplex piston pattern steam pump.
- Two (2) 7½-in. by 10-in. by 18-in. Laidlow, Dunn, Gordon duplex steam.
- Two (2) 7½-in. by 4½-in. by 10-in. Worthington duplex piston pattern steam pumps.

CRUSHERS

- One (1) No. 5 Type K Gates Gyratory.
- One (1) No. 5 McCully Gyratory.

The Dolomite Products Co.
1110 Euclid Ave., Cleveland, Ohio.

Machinery For Sale

One complete Rock Crushing Plant.

DRYERS—Direct-heat rotary dryers, 3x25 ft., 3½x25 ft., 4x30 ft., 5x35 ft., 5½x50 ft., 6x50 ft. and 7½x80 ft.; double shell dryers, 4x20 ft., 6x30 ft. and 6x35 ft.; steam-heated air rotary dryers, 4x30 ft. and 6x30 ft.

KILNS—Rotary kilns, 8x60 ft., 6x60 ft., 3½x25 ft. and 8x25 ft.

MILLS—24-in., 22-in. and 16-in. Schutz-O'Neill mills; 6x5-ft., 2½x3-ft., 3x3½-ft. pebble mills; 5x3½-ft., 6x4-ft., 4½x3½ and 2½x2¾-ft. ball mills; 3-ft. Marcy mill; 83-in. and 24-in. Fuller-Lehigh mills; 4½x20-ft., 5x11-ft., 5x22-ft. and 6x20-ft. tube mills; 20x13-in., 9x12-in., 7½x13-in., and 7x10-in. jaw crushers; one type "A" and one No. 3 Williams' swing hammer mills; one Kent type "G" mill; one Aero pulverizer, type "D"; two 36-in. and one 42-in. cage mills; one 8-ft., two 4½-ft. and two 3-ft. Hardinge conical mills; 18x12-in., 20x12-in. and 30x10-in. roll crushers; No. 0, No. 1 and No. 3 Sturtevant rotary crushers; one No. 2 Sturtevant ring roll crusher; one 4-roll Raymond mill; one No. 5 Tel-smith breaker; one 36-in. Sturtevant emery mill; four Giant Griffin mills; one Junior Griffin mill; one 51x14-in. chaser mill.

SPECIALS—Emerick 3-ft. separator; four 6x8 ft., four 6x6-ft. kominturs; one McDougal and one Wedge mechanical furnaces; five automatic package weighing machines; electric arc furnaces; jigs; one Keystone excavator; 6x8-ft., 6x5-ft. and 4x3-ft. Newaygo vibrating screens.

All this equipment is complete and in good condition.

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269 ft. 12 in. 8-ply....\$1.66 per ft.
150 ft. 14 in. 8-ply.... 1.94 per ft.
978 ft. 16 in. 8-ply.... 2.22 per ft.
1166 ft. 18 in. 8-ply.... 2.49 per ft.
407 ft. 20 in. 8-ply.... 2.76 per ft.
1200 ft. 18 in. 6-ply.... 1.87 per ft.

Offered at an unusually low price.

National Belting and Salvage Company
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On account death, machinery for complete sand lime brick plant that cost \$40,000, for quick sale, at \$8,500. Big demand for brick, exclusive territory, no other brick plant. For particulars write

F. MULLIGAN

1129 First Ave., Spokane, Wash.

Immediate Delivery

4—No. 6 GATES CRUSHERS

Reg. drive, nickel steel shaft, fine condition. extra manganese mantle, West shipment.
1—No. 8 Gates reg. drive, Ohio ship.
2—Crushers, Nos. 2 to 10, mostly Gates.
9—150 H.P. 125 lb. H.R.T. Rollers, butt strap.
2—48"x12" Taylor Manganese Screens.
25—Air Compressors, 60 to 4,000 cu. ft.
1—9x8 Ingersoll-Rand steam.
1—427 cu. ft. Chicago pneumatic steam.
1—2400 ft. Sullivan two stage, also 3000 ft.
1—95 H. P. Loco. type boiler, Illinois ship.
75—Steam and centrifugal pumps.
1—30-60 H.P. Emerson-Brantingham tractor. \$1600.
1—No. 4 CRUSHING PLANT (A.C. motor drive). Concrete mixer—contractors' equipment. 3000 ft. Trac. Cable, 5/8" Roebling.

Send us your inquiries for electrical equipment, pavers, engines, hoists, etc.

Ross Power Equipment Co., Indianapolis Indiana

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1—Gates No. 5 type "K" Gyrotory Crusher, standard back drive, extra new pinion, chilled iron fitted, excellent condition. Also all sizes jaw and Gyrotory Crushers, all types, capacities Pulverizers.

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15 to 20 36-in. gauge 2-yard Koppel V-shape two-way side dump cars.

Must Be First-Class.

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Standard Gauge Locomotives

1—30-ton four-driver saddle-tank American.
1—40-ton 17x24-in. four-wheel switcher.
2—50-ton 18x24-in. six-wheel switchers.
1—18-ton 10x16-in. 36-in. gauge Vulcans.
2—14-ton 9x14-in. 36-in. gauge Vulcans.
2—10-ton 7x12-in. 36-in. gauge Vulcans.

MISCELLANEOUS

1—Monighan Dragline, 120-ft. boom, 3 1/2-yd. bucket.
1—Bucyrus dragline, 60-ft. boom, 2-yd. bucket.
13—16-yd. dump cars.
40—10,000-lb. capacity flat cars.
1—Western standard gauge Spreader.
2—1-yd. Foote side-discharge concrete mixers.
50-lb. and 56-lb. rail, ties, 1 1/2-yd. clamshell bucket, and 10-h.p. and 45-h.p. upright boilers. Railway equipment, etc.

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SAND AND GRAVEL PUMPING OUTFIT, complete, consisting of one 10" Morris Pump, direct connected to double 9x9 engines. One Scotch Marine boiler 11'6"x 11'6", about 200 H.P., allowed 150 lbs. One Bartlett & Snow Crane, 50' steel boom, 1 yd. bucket.

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THE SAND MAN

Schofield Bldg.

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800 ft. Laidlaw belt driven compressor, with 200-H.P. AC motor.
1924 ft. steam driven, two stage Norwalk compressor.
400 ft. Ingersoll-Rand steam driven compressor. 150—60 and 30-H.P. fire box boilers.
10—Western 12-yd. cars.
Page dragline buckets, 2 1/2, 1 1/2 and 1-yd. sizes. 60 ft. dragline excavator boom.
9x10 excavator hoist.
Dragline excavators, 40 ft. and 60 ft. booms.
No. 1 Thew shovel, ry trucks, 1-yd. dipper.

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1—14x21 Bal Val S. C. Engine
1—22x5 ft. Tube Mill, complete
4—No. 4; 1—No. 2 Nye Sand Pumps
400 ft. in. pipe; 500 ft. 2-in. pipe; 1,000 ft. 1 1/2-in. pipe.
All good condition.

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PORTAGE, WIS.

FOR SALE

Surplus Quarry, Mill and Industrial Equipment

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1— 9 x12-in. Struthers-Wells, center crank.
1—12 x16-in. Nagle, center crank.
1—12 x18-in. Skinner, center crank.
1—12 x24-in. McEwen, center crank.
1—10 1/2 x16-in. Eagle Iron Works, L. H. crank.
1—12 x24-in. Exeter, L. H. crank.
1— 8 1/4 x10-in. Single drum hoist.
1— 6 x 5-in. Sturtevant.
1—20 x42-in. Putnam.

Crushers

2—No. 4 Champion jaw crushers.
1—No. 5 Champion jaw crusher.
1— 9x14-in. Acme jaw crusher.
1—13x30-in. Farrel jaw crusher.
1—18x30-in. Acme jaw crusher.
1—24x54-in. McLanahan jaw crusher.
1—18-in. Bonnot pulverizer.

Boilers

1— 40 H.P. Locomotive type.
1— 50 H.P. Locomotive type.
1—100 H.P. Locomotive type.
2—150 H.P. Horizontal, plant boilers.

Pumps

1— 6x 8 1/2 x 6-in. Snow.
1—10x10 1/2 x12-in. Dean.
1— 7-in. suc. 6-in. dia. Worthington.

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1—No. 3 Wilberham-Green.
1—No. 6 Wilberham-Green.
1—No. 5 Sturtevant.
1—No. 4 American "Sirocco."
1—Buffalo Forge single conoidal type fan, 44-in. connections.

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1—R.R. Bridge, 54 ft. 7 in. long, 4 ft. 6 in. deep.
1—R.R. Bridge, 65 ft. 4 in. long, 5 ft. 6 in. deep.
12—Bridge Girders, 16 ft. long, 15 in. deep, 7 1/2-in. face.
4—Bridge Girders, 26 ft. 3 in. long, 15 in. deep, 7 1/2-in. face.
4—Bridge Girders, 38 ft. 4 in. long, 18 in. deep, 7 1/2-in. face.

Miscellaneous

1—Steel pan elevator, 35 ft. centers, pans 60x16x18 in.
1—Stationary horizontal hydrating cylinder, 42 in. diam., 27 ft. long.
1—Ingersoll-Sargent air compressor, Class A, 12x12 1/2 x12 in.
1—Improved flour dresser.
1—Stillwell-Bierce 24-in. turbine water wheel.
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20—Steel end dump quarry cars 2 1/2 yd., 48-in. gauge.
1—Davenport 18-ton dinkey, 48-in. gauge.
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2—9 ft. Carlin dry pans.
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1—Morgan revolving gas producer, automatic stoker and ash remover.

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Twenty-one 14 ft. 15 in. I beams, weight 42 lbs. to the foot.

Located at Yellow springs, Ohio. Apply

Cedarville Lime Co.,
Cedarville, O.

For Sale

One second-hand Keystone Steam Trac-tion Well Drill, No. 3, in fine condition.

York Stone & Supply Co.
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WANTED

About a 13-ton, 36-inch gauge loco-motive and 15 or 20 Austin, two-yard, end dump, 36-inch gauge, quarry cars.

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Box 213

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New—RAILS—Relaying

All sections on hand for quick shipment. Reasonable prices quoted. Our stock is very complete.

M. K. FRANK
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WANTED

No. 1 Sturtevant Ring Roll Mill; must be in first-class condition.

James H. Rhodes & Co.
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Wanted

To buy complete stone crushing plant equipment in good serviceable condition. State full information under G. W., care Rock Products.

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Help Wanted

WANTED

Mechanic to keep up crushing machinery at trap rock quarry. Must be thoroughly familiar with Gates crushers and not afraid of hard work. Permanent position for good man. Advise age, experience and salary expected. Address

**Big Rock Stone &
Construction Co.**
111 Center Street, Little Rock, Arkansas

Wanted

A man experienced in the operation of vertical lime kilns and capable of man-aging a small plant. State experience, references, and salary expected. Address

Box No. 1408, c/o Rock Products.

WANTED

Foreman capable of getting out rough dimen-sion stone. Man must be thoroughly ac-quainted with plug and feather methods, and capable of handling men to advantage. Stone is loaded with derricks.

Box 1412 Care Rock Products

Help Wanted

WANTED

Superintendent for Cuban Cement Plant; must have thor-ough experience and be able to supervise complete erection of plant and thereafter superintend the production of cement. Give full particulars as to experience, references and salary desired and when services available.

Box 1411 Care Rock Products

Plants For Sale

FOR SALE

Castle Mountain, near Alberta, on C.-P. Rail-way. Excellent limestone and clay for cement manufacture. Over 100 acres. Low price. Apply to F. Crosland, Chepstow Avenue, Lisard Cheshire, England, or to George Robinson, The Gap, Alberta, who will show the property.

Miscellaneous

WANTED

Responsible parties to erect and operate a hydrated and agricultural lime producing plant on my property at Bronson, Michi-gan, formerly owned by the Bronson Port-land Cement Company, located on N. Y. C. R. R. 200 acres fine marl land with commodious steel and cement buildings with large storage capacity already built. Also sidetrack on property connecting with main line of R. R., office buildings, dredges, etc. Location, two miles from city. Main Lincoln Cement Highway ¼ mile from plant. Desire to furnish marl, buildings and equipment on hand on roy-alty basis. Plant surrounded by finest ag-ricultural lands in Michigan and Indiana. Large demand for products. Capital re-quired, \$150,000.00 to \$200,000.00.

F. M. RUDD
Bronson, Michigan

Plants for Sale

For Sale

First-class stone quarry in central Iowa. On Lincoln Highway near city of 20,000. Three railroads; 40 ft. face, 100 rods long. Recom-mended by State Highway Commission for road building purposes. Closest competition eighty miles. Stand closest inspection.

Box 1410 Care Rock Products

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MADE TO SUIT YOUR REQUIREMENTS
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Service and Quality
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THE PRODUCTION
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SUPERIOR NON-ROP-WER SHEAVES

They reduce rope wear to a minimum. Save power and insure safety. Increases Hoisting Efficiency. They cost no more than ordinary sheaves. Write for booklet today.

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For Mortar, Cement and Brick—
Brown, Black, Red and Buff
—Strongest and Most Durable

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Correspondence Solicited

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Consisting of a modern crushing, storage and loading plant, having a crushing capacity of three hundred tons per hour.

Unlimited supply of high-grade Trap Rock, the best known material for roads and concrete construction, because of its exceptional hardness, toughness, cementing and fire-resisting qualities.

Cheap transportation to all Great Lakes and nearby territory.

Plant all ready and equipped for immediate operation.

An exceptional opportunity to obtain a plant and equipment at a fraction of its replacement value. Address

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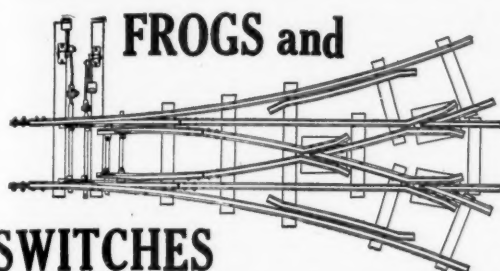
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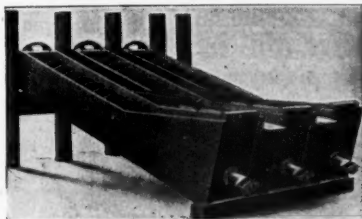


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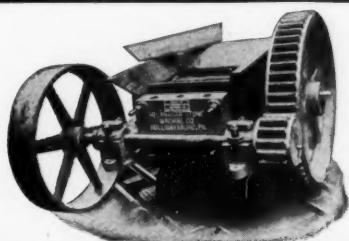
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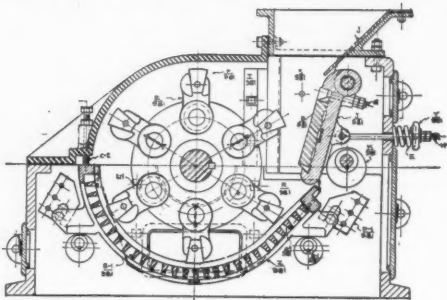
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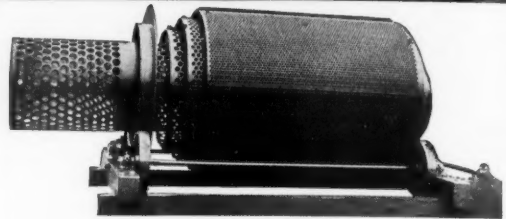
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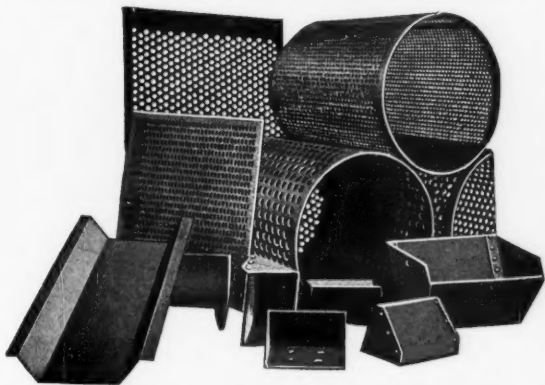
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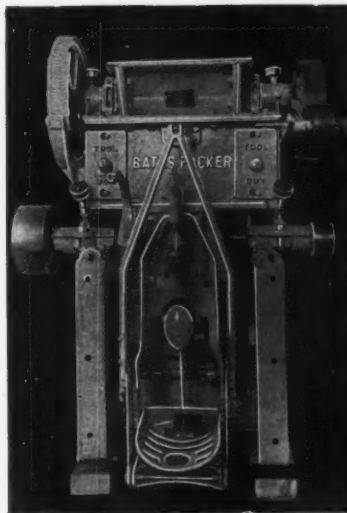
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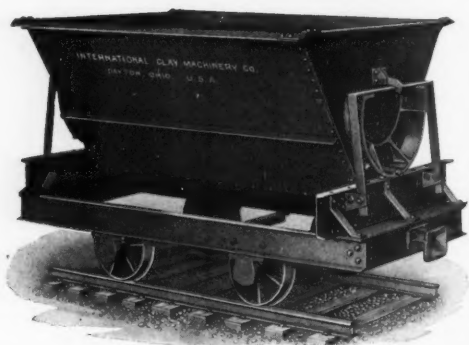
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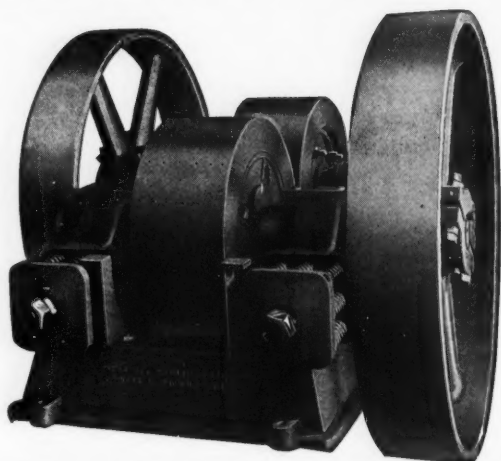


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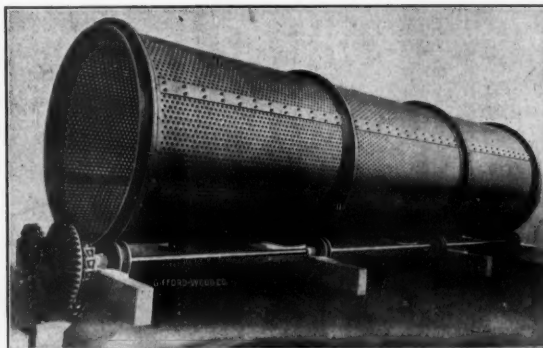
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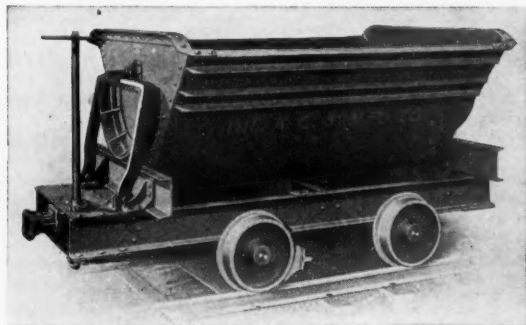
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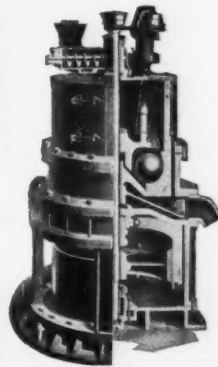
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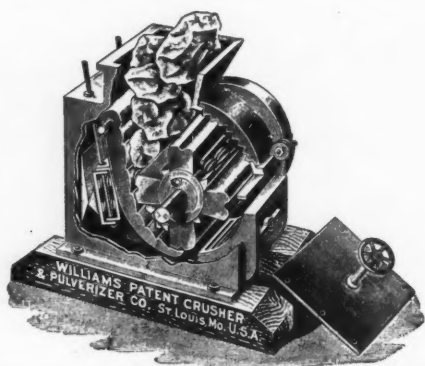
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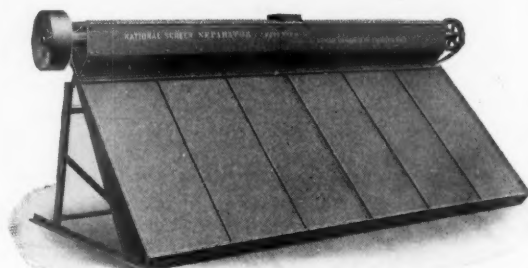
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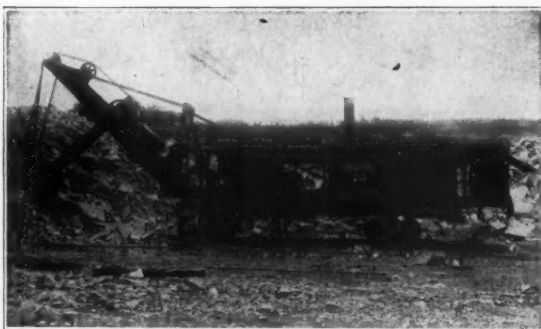
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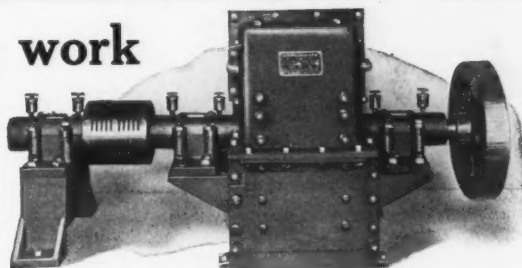
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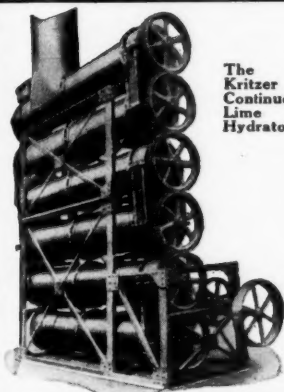
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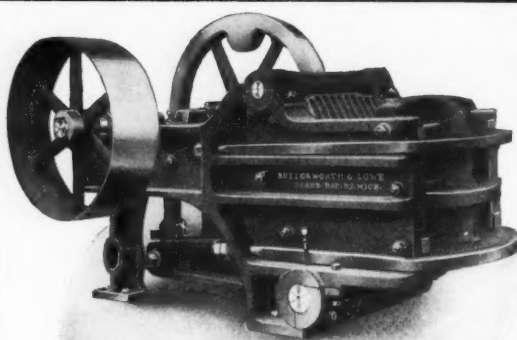
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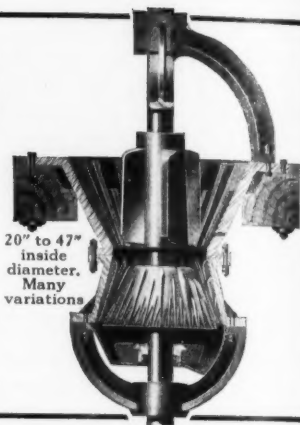
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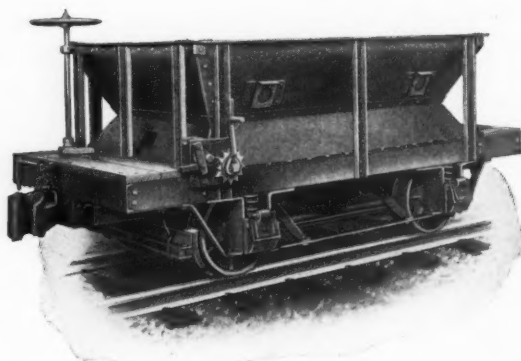
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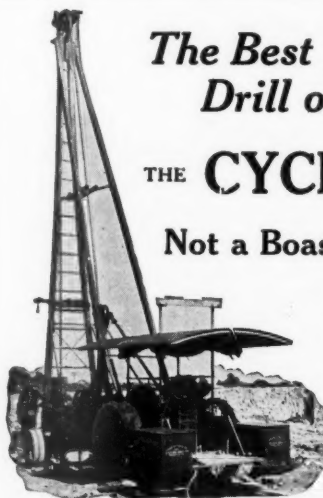
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SCHAFFER Continuous Lime Hydrators

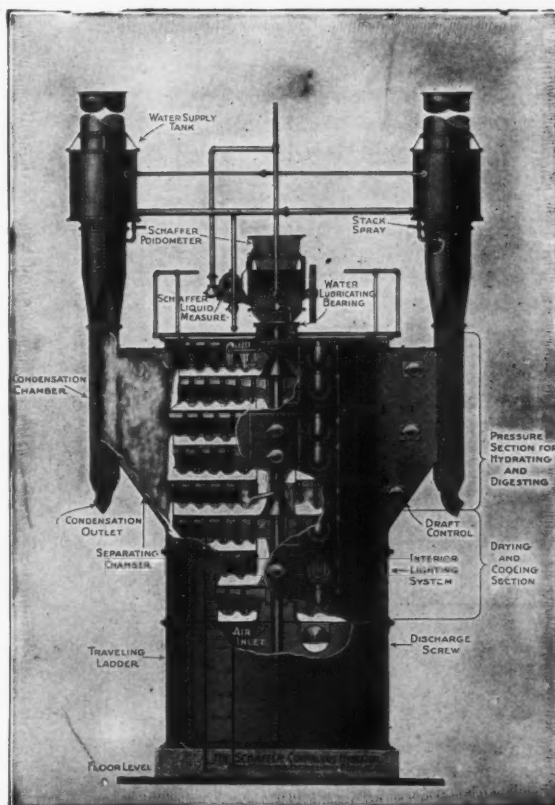
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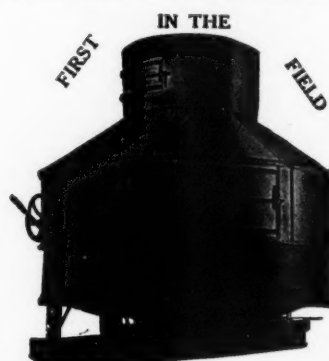
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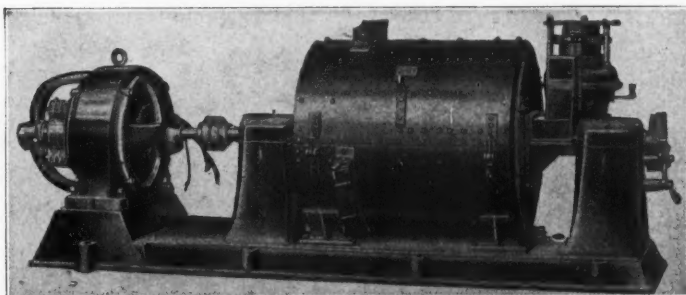


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The AERO PULVERIZER



is designed as a complete unit for one furnace. They are built in five standard sizes ranging in capacity from 600 lbs. to 5,000 lbs. of coal per hour. Dust-proof and strongly built. All parts susceptible to wear are easy of access.

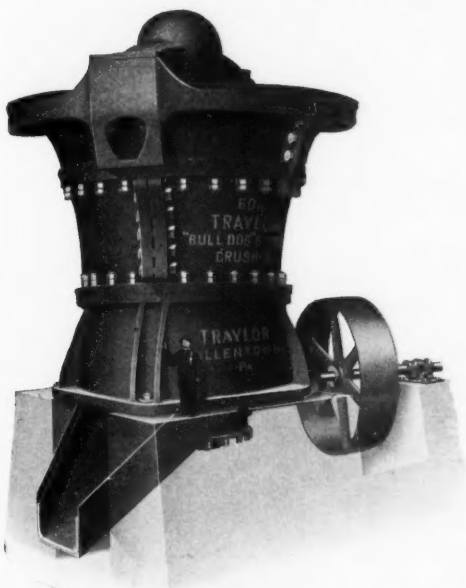
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The "Bulldog" Bend-Proof Shaft



means tremendous savings in your gyratory account. It means continuous and dependable operation with a greater output per horse-power consumed. And this is only one feature of

Traylor "Bulldog" Gyratory Crushers

Let us tell you why the "Bulldog" shaft will not bend, and of the many "Bulldog" features—the Hewes Spider, the larger and longer eccentric, the cut steel gears that run in oil, and many others.

It's all in Bulletin RGX-1

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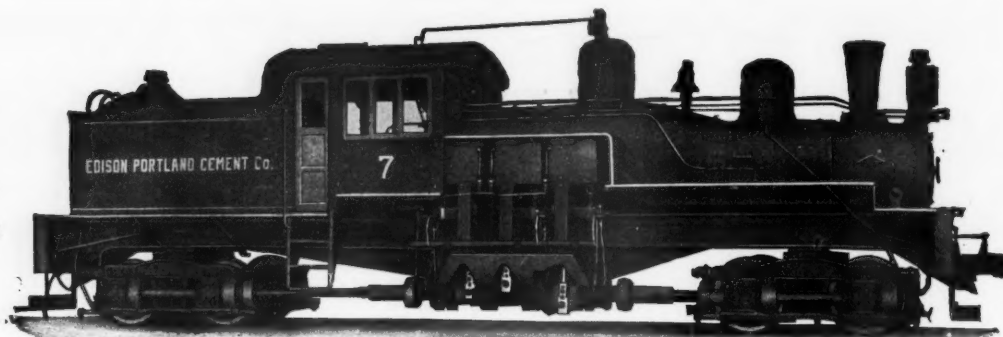
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Cordeau-Bickford Detonating Fuse

For well drill blasting and the tunnel and pocket method of blasting, where large quantities of explosive are to be detonated, use safe, efficient Cordeau-Bickford and get lower blasting costs.

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Established 1836 Original Makers of Safety Fuse



60-TON SHAY ENGINE BUILT BY LIMA FOR EDISON PORTLAND CEMENT CO.

More Work in Less Time

Shay locomotives do more work in less time than rod engines.

They start instantly, without the need of "taking slack."

They spot cars accurately because of their

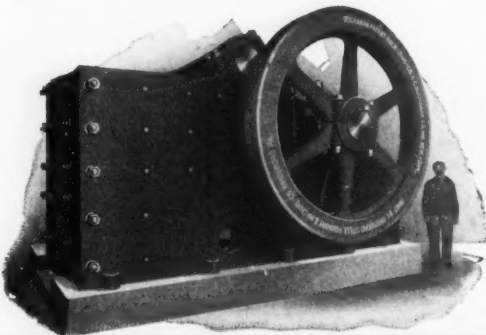
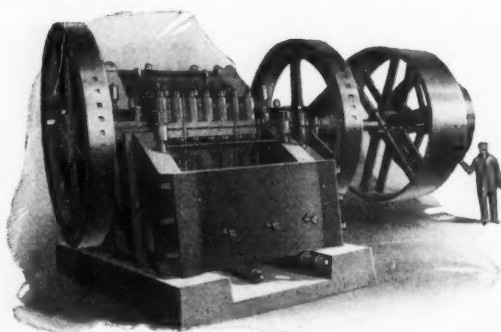
multi-cylinder engines and gear drive.

They pull with an even, steady pull like that of an electric motor—avoiding damage to equipment.

Shays mean increased production.

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LIMA, OHIO 30 Church St., New York

A Breaker Without a Pitman



If you received such a Jaw Breaker you'd be up against it, wouldn't you? Exactly. That's why all

BUCHANAN JAW CRUSHERS
ALL STEEL PATENTED

are equipped with an extra heavy steel pitman; for a breaker with a broken pitman is in the same shape as one without any.

Remember that the ordinary pitman is subjected to at least one-third of the total strain due to crushing.

Accordingly we make every Buchanan Pitman sufficiently heavy to stand the strain but spring balanced to overcome the weight. This combination gives a balanced Pitman of unusual strength.

Wouldn't you like a copy of our Bulletin No. 10?

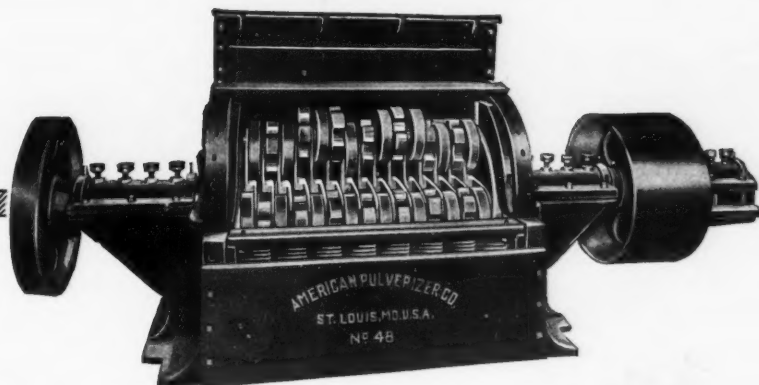
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The Columbia Quarry Company, after using one, installed three more and are now producing fifty tons per hour. Our pulverizers will supply agricultural limestone from $\frac{1}{8}$ inch product and under.

It has high capacity and low power consumption. In fact there are so many features to it we would like to go more into detail with plans and prices. Write today.

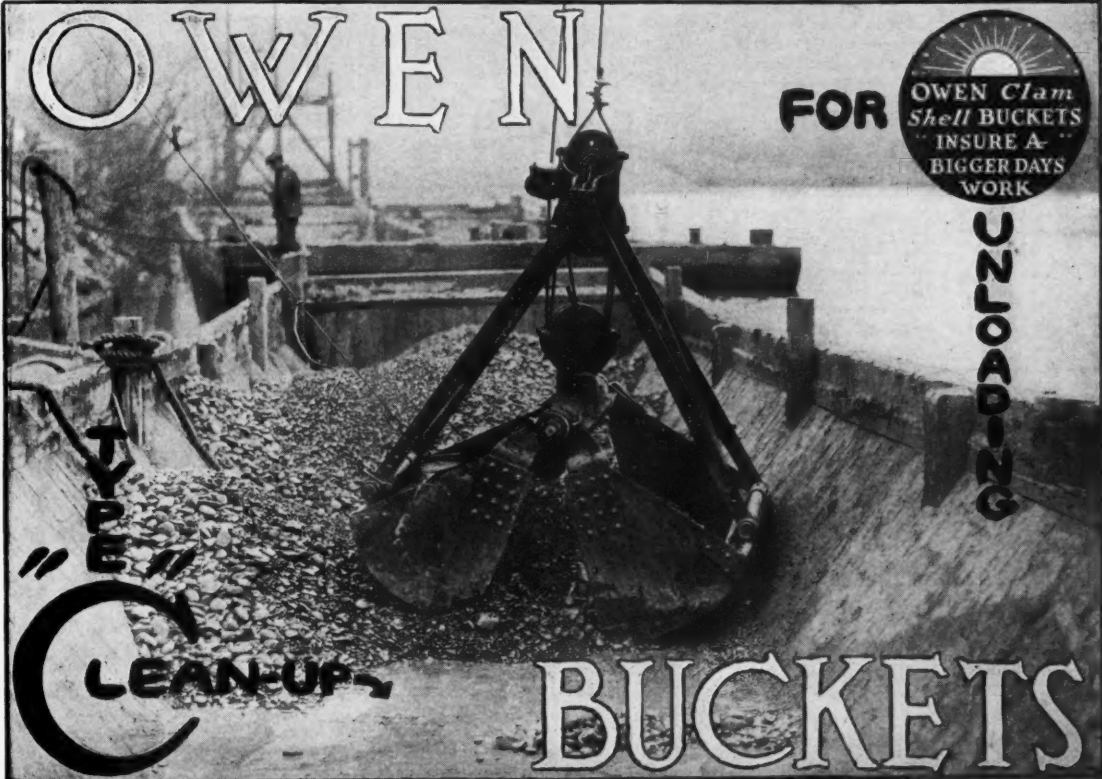
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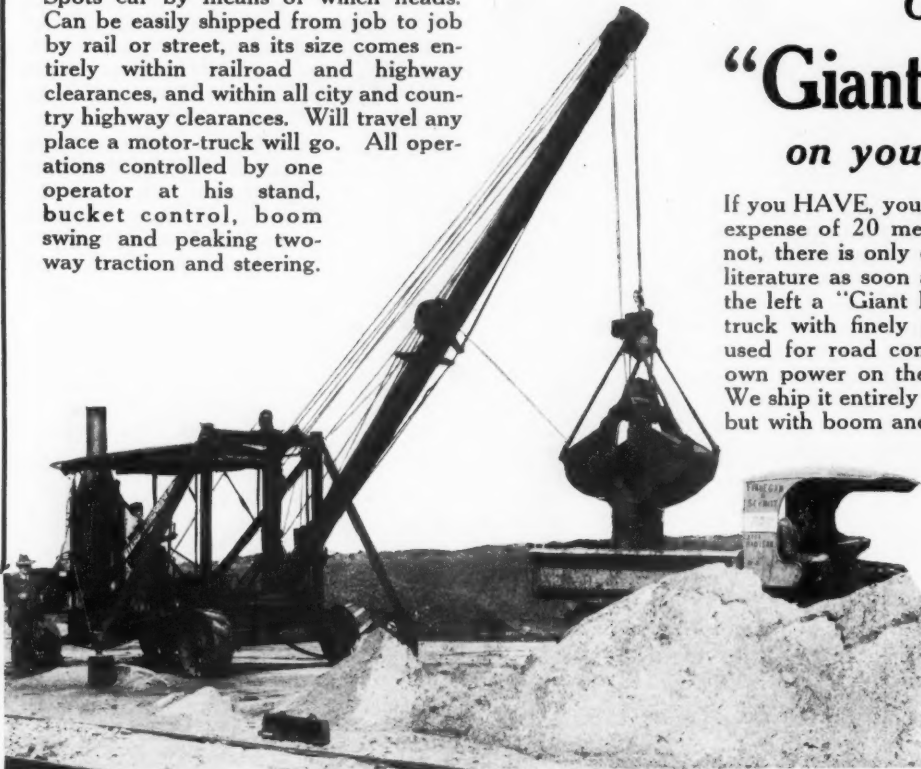
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If you HAVE, you have been able to cut the expense of 20 men or more. If you have not, there is only one remedy—write us for literature as soon as you can. We show at the left a "Giant Hunky" loading a motor-truck with finely pulverized shale dressing used for road constructing. It runs by its own power on the ground—needs no rails. We ship it entirely set up and ready to work, but with boom and wheels removed.

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information

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Machine Co.**

Steam, Gasoline or Electric
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(INCORPORATED)

Gravel, Sand and Crushed Granite Boulders

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Oct. 15, 1919

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Yours very truly,
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*This
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has pumped over
300,000 yards (cubic)
of sand and gravel
and is still in
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Increase Your Production

of high grade lime by heating your kilns with producer gas generated in

CHAPMAN Agitator Producers

They deliver a constant supply of high quality gas, thus insuring a uniform temperature in the kiln. This uniform supply of high quality gas burns with a long, clear flame which resembles the flame from a wood fire. The result is a greater production of first grade lime.

The Chapman Floating Agitator will increase the capacity and the efficiency of hand-poked producers already in operation.

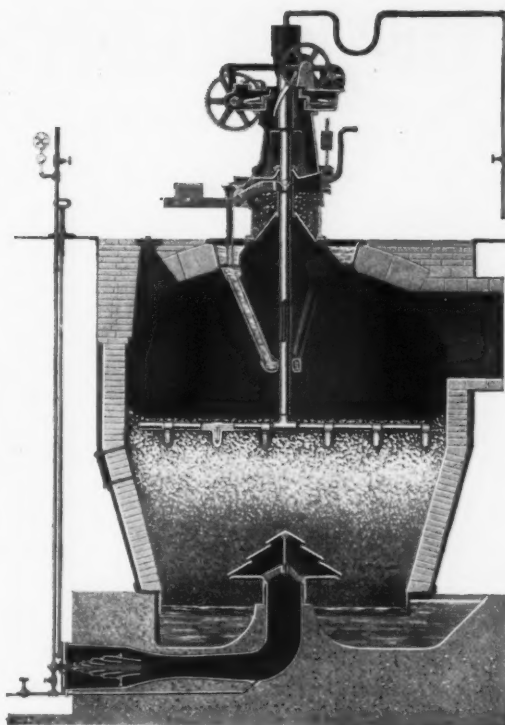
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The Chapman Engineering Company

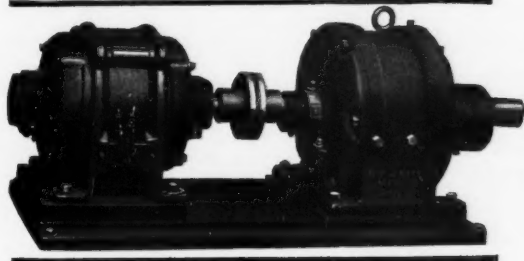
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**Provide
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save space and save power. They are compact and easy to install. They are dust-proof and fool-proof. In cement, stone, and lime plants, where space is at a premium, and where dust conditions are unusually severe, James equipment for reducing motor speed appeals to the plant engineer. The power is delivered more economically and with less strain on the motor.

Any reduction of speed from the ratio of 4:1 to 1600:1 can be furnished.

Our engineering service is ready to assist you in definitely solving your problems connected with the economical delivery of power by direct connected motors.

Send for our latest
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KEEP THINGS MOVING

Do It Mechanically With



EQUIPMENT

Weller Made Elevating, Conveying and Power Transmitting Machinery will help increase production and reduce operating expenses.



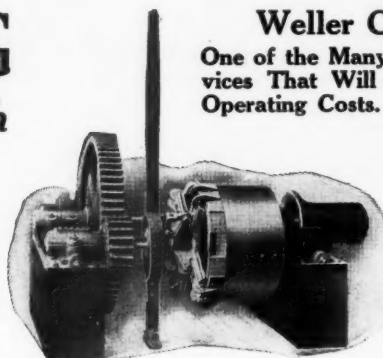
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Insures Service



Weller Steel Bushed Conveyor Chain with Case Hardened Bushings and Pins. We make chain to meet your requirements. Write for price list R.

Weller Car Pullers

One of the Many Labor-Saving Devices That Will Help You to Cut Operating Costs.



Direct Connected
or
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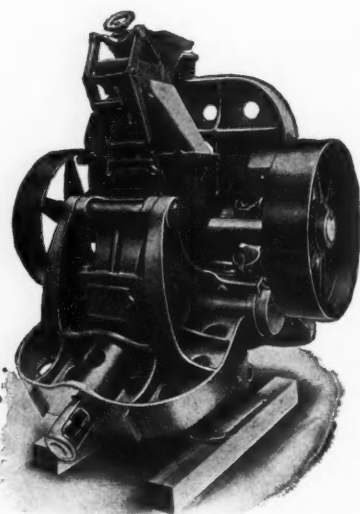
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The UNIT that has LARGER
OUTPUT with LESS POWER
WEAR and ATTENTION than
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It will be to the interest of those who operate CEMENT
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Drop us a line

We will be glad to tell you about it

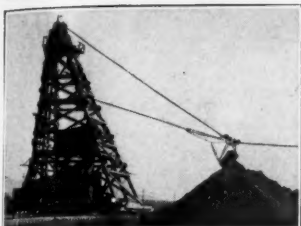
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SAUERMAN DRAGLINE CABLEWAY EXCAVATORS

A Message to All Who Have Excavating Prob- lems to Solve

For excavating and handling materials over a large area, the Sauerman Dragline Cableway Excavator (patented) is generally the most economical machine to employ, as it does away with the auxiliary conveying system required by other types of excavators.

Its ability to work over spans of 100 to 800 ft. or more and to dig, elevate, convey and dump in one continuous operation makes the Sauerman Dragline Cableway Excavator particularly economical and efficient for digging sand, gravel and other materials from under water and it is often used instead of a pump or dredge.

This same long operating radius and deep digging ability have led to the use of our dragline cableway excavator for a wide variety of other excavating work which cannot be economically handled with steam shovels or boom dragline excavators. It is being successfully used for deepening rivers, building levees, stripping clay beds, mining placer materials, cleaning reservoirs, reclaiming ore and coal from stock piles or storage, loading ballast, etc., in addition to being standard equipment for commercial sand and gravel plants.

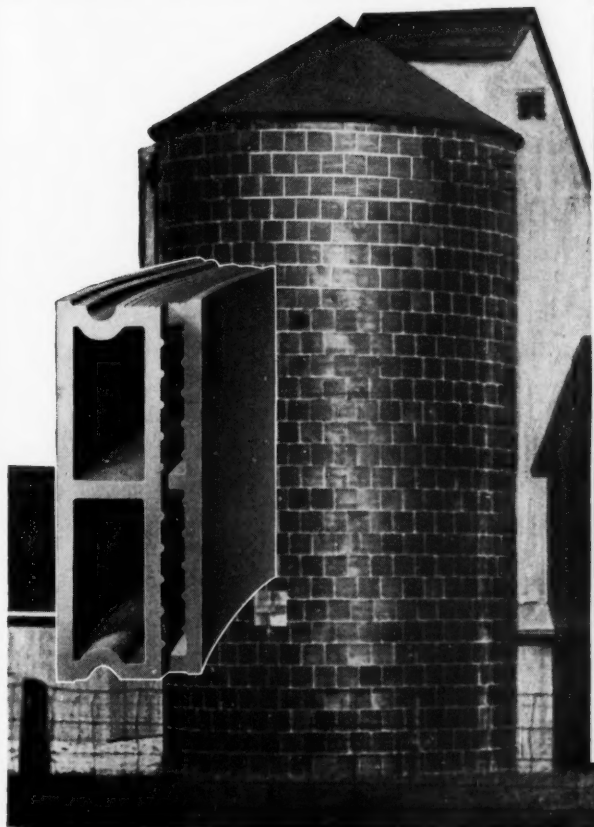
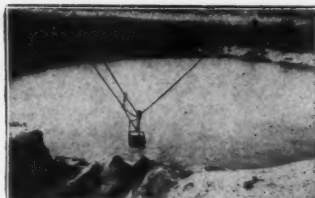
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1140 Monadnock Block

CHICAGO

-dig, convey, elevate & dump in
one continuous movement under
complete control of one man



Preston Lansing Tile Storage Bins

Made of the ideal material for storing
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Preston Lansing VITRIFIED TILE BINS

Moisture Proof—No Upkeep Expense

Special "ship-lap" joint construction
with braces against each other; blocks
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thick layer of concrete.

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(Photo to left shows the Preston Lansing Storage Bin for
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Classified Directory of Advertisers in Rock Products

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for

Sand and Gravel Plants

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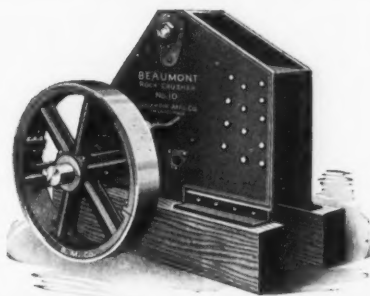
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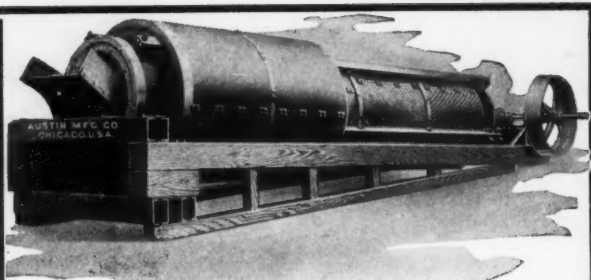
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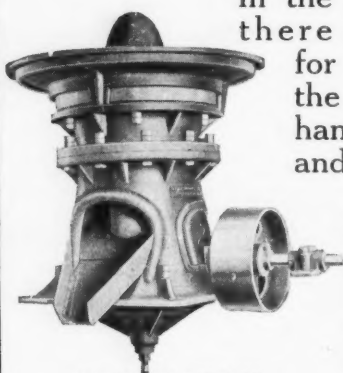
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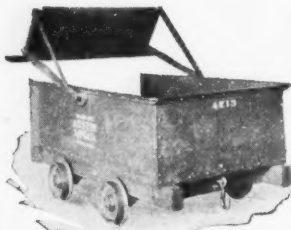


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